Model CTD-2200 Series

Stereo Cassette Tapedeck, Built in Dolby System.

CTD-2200(E)
CTD-2200(GE)
CTD-2200(X)

DOLBY SYSTEM
Noise reduction circuit made under licence from Dolby Laboratories.

Service Manual

SPECIFICATIONS

Track	4 Track 2 Channel Stereo	
Recording System	AC Bias	
Erase System	AC Erase	
Tape Speed	4.75 cm/sec $^{+3}_{-1}$ %	
Wow and Flutter	Less than 0.3% (RMS)	
Record/Play Time	60 minutes (C-60)	
FF/REW Time	Within 105 sec (C-60)	
Input Sencitivity	MIC	0.3 mV/3.3kΩ
	DIN	1.8 mV/3.3kΩ
	LINE	40∼70 mV//47kΩ
Frequency Response	Normal	30∼14 kHz $^{+2}_{-5}$ dB
	CrO_2	30∼16 kHz $^{+2}_{-5}$ dB
	FeCr	30∼16 kHz $^{+2}_{-5}$ dB

Output Voltage	DIN OUT 580 mV ±2 dB (MTT-150)
Headphone Output Power	40 mV (8Ω)
S/N Ratio	More than 46 dB (Dolby Off Position)
Erase Effect	More than 60 dB (1 kHz)
Channel Separation	More than 20 dB (1 kHz)
Distortion	2.5%
Record Bias Frequency	85 kHz
Power Source	CTD-2200(E), CTD-2200(GE) 220V 50/60 Hz CTD-2200(X) 117/220V 50/60 Hz
Dimensions	400(W) × 280(D) × 145(H) mm
Weight	6.1 kg

CROWN (JAPAN) RADIO CORPORATION
TOKYO • OSAKA • SAN FRANCISCO • PANAMA • DÜSSELDORF • LONDON

DISASSEMBLY

1. Removal of front cover

1. Remove the tapping screws 1 through 5 (see Fig. 1).

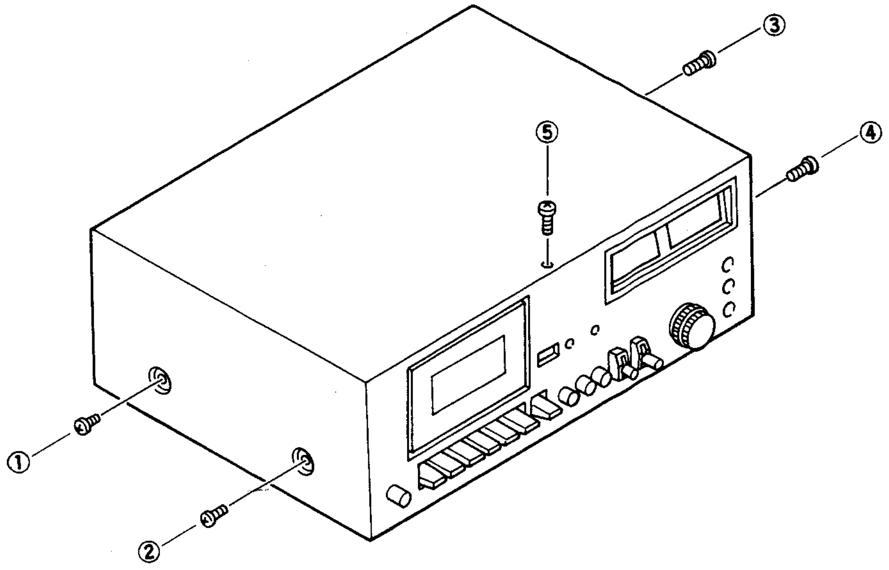


Fig. 1

2. Removal of front panel

1. Remove the volume knob and Eq/Bias knob.
2. Remove screws 1 and 2 in Fig. 2.
3. Then, remove screws 3 through 7.

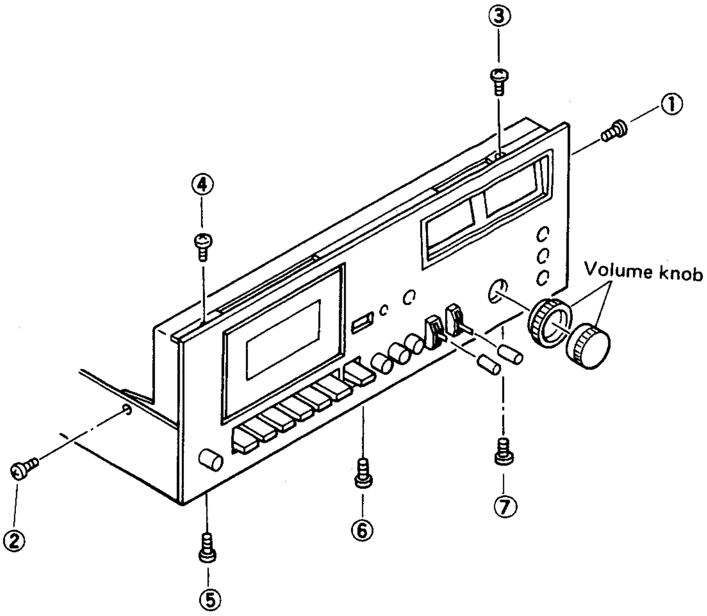

③
①
④
Volume knob
②
⑥
⑦
⑤

Fig. 2

3. Removal of cassette lid

1. Press the Eject Button to open the cassette lid.
2. Hold the cassette holder by hands as shown in Fig. 3. Pull the cassette lid toward you while pressing the cassette holder down so that the lid opens slightly. Then, lift the lid carefully for removal.

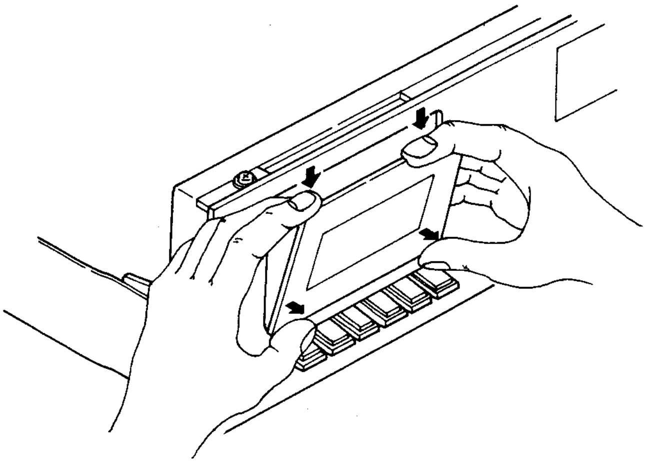


Fig. 3

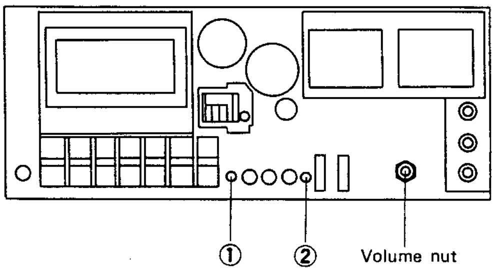


Fig. 4

4. Removal of front chassis

1. Remove screws 1 and 2 in Fig. 4.
2. Remove the nut of the volume control.
3. When removing the front chassis, be sure to take off the wire.
4. When removing the wire (remote switch on the AMP REC switch side, pull it up while holding the case of the wire (see Fig. 5).
5. When removing the wire (remote switch) on the mechanism side, press it at the part C using a flat blade screwdriver.

NOTE 1: Do not pull the part A, as it will damage the case of the wire. For removal, hold the part B firmly.

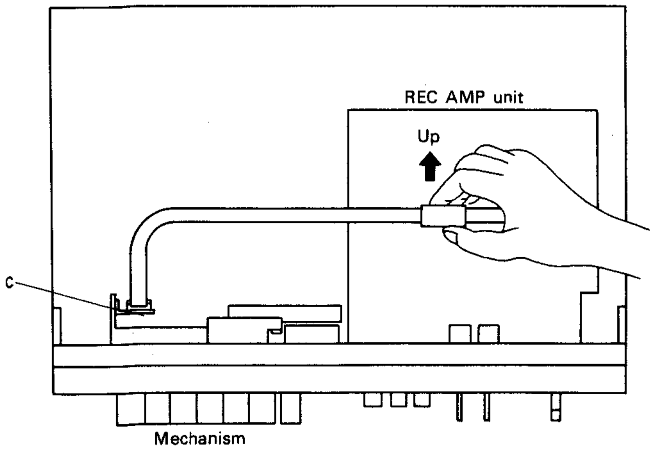
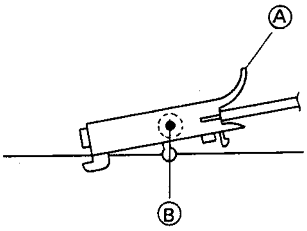


Fig. 5



NOTE 2: Handle the wire (remote switch) observing the following points:

1) When removing or attaching the wire (remote switch), do not use a pliers or nippers. Always use your hand.
2) Do not attempt to reshape the wire with hand.
3) When inserting or removing the wire, do not pull the wire or replace it by holding it with hand.
4) Do not attempt to fix the wire to the chassis by using a clamper or similar object.
5) Do not sharply bend the wire.

5. Removal of mechanism

1. Remove the mechanism according to Items 1 through 4.

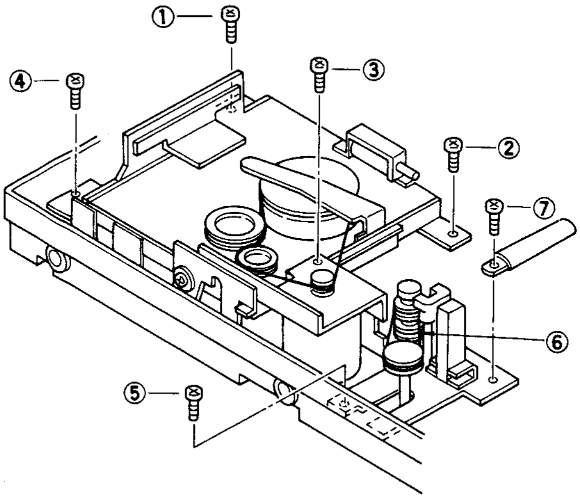


Fig. 6

2. Be sure to remove the drive belt (5) on the tape run ass'y.
3. Remove the screws (6 and 7) holding the tape run ass'y (see Fig. 6).
4. Remove the screws (1 through 4) in Fig. 6.

NOTE: After removing the screws, disengage the leads from the lead clamp, then remove the mechanism from the front chassis. In this way, the mechanism can be removed easily.

6. Removal of AMP circuit board

1. Remove the circuit board according to Items 1 through 4.
2. Remove the screws (1 through 3) in Fig. 7.

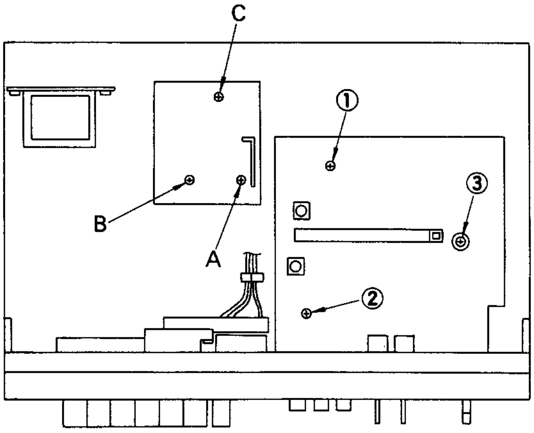


Fig. 7

NOTE: 1. The circuit board has a large number of leads. Do not pull the leads by force.
2. When removing, disengage the leads from the wire clampers. After repair, be sure to arrange the leads as before.

7. Removal of power supply wiring board

1. Smash the wiring board at the bushing using a pliers until the pattern comes off (remove A, B and C in Fig. 7).

   NOTE: Slightly pull the wiring board and smash each bushing with a pliers for removal.

2. When removing the wiring board, be careful not to damage the leads.

ELECTRICAL ADJUSTMENTS

- Test Instruments

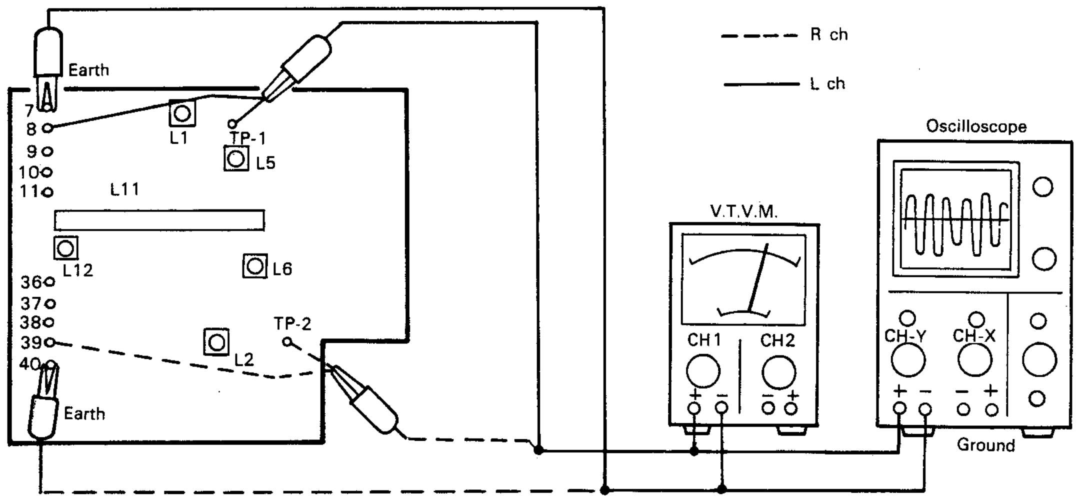
Test Instruments and Test Tapes		Tools Required
• Audio signal generator (AF)	Model 417A	• Insulated screwdriver
• Attenuator (ATT), 600-ohm	AT-11	
• Oscilloscope	LBO-552	
• V.T.V.M.	LMV-186A	• DIN cord
• Distortion meter	MAK-659A	• Alligator clip
• Dummy resistor	47k-ohm, 1/4W (J)	
• Tape reel		
• Test tape	MTT-114 (10 kHz, −10 dB) MTT-150 (Dolby "B" type, Tone: 200 nwb/m, 400 Hz)	
• Blank tape	AM-N-220 (chrome tape) AM-N-221 (normal tape)	

Precautions

1. Before making adjustments, be sure to clean the tape heads with alcohol. Also, demagnetize the record/play head using a demagnetizer.
2. Make sure that the adjusting screwdriver is not magnetized.
3. Connect the test instruments according to the diagram in "Adjustments".
4. The connection diagram shows the connection of 2-channel V.T.V.M. and oscilloscope. If these instruments are not available, single channel instruments can be connected.

A. Trap Adjustment

- Test instrument connection diagram



R ch
L ch
Earth
7
8
9
10
11
L1
TP-1
L5
L11
L12
L6
36
37
38
39
40
TP-2
L2
Earth
V.T.V.M.
CH1
CH2
Oscilloscope
CH-Y
CH-X
Ground

Fig. 1

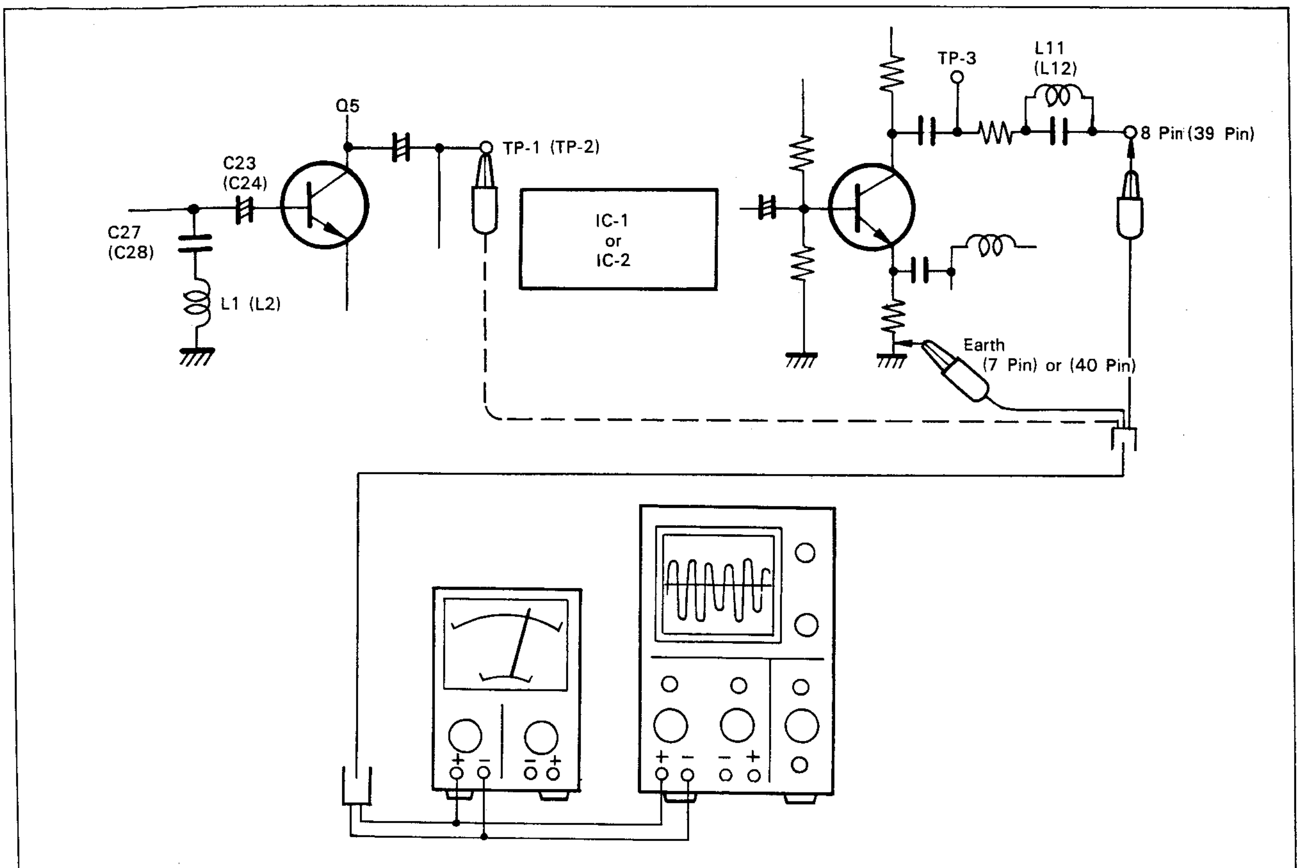


Fig. 2

- Connection of test instrument
  - * Oscilloscope and V.T.V.M. should be connected as shown in Fig. 1. Connect the instruments to the test point and terminals designated on the AMP circuit board.
  - * Adjust R channel for minimum value by the trap coils L12 and L2.
  - * Adjust L channel for minimum value by the trap coils L11 and L1.

- Voltage adjustment

  Turn trap coils for minimum readings on V.T.V.M.

- Adjustment procedures

  NOTE: a) First adjust the trap coils L12 and L11, then adjust L2 and L1.

  b) Set REC volume control to maximum position, MIC/DIN selector switch to ON, and EQ/Bias switch to the center (NORMAL) position.

1) Operate the unit in recording mode. Set V.T.V.M. to 300 – 100 mV range.
2) Connect the leads of V.T.V.M. to the terminals (No. 40 and 39) on the AMP circuit board. The positive side of V.T.V.M. should be connected to the No. 39 terminal and the negative side to the No. 40 terminal.
3) Adjust R channel by turning the trap coil L12 for minimum reading on V.T.V.M.
4) Connect the leads of V.T.V.M. to the terminals (No. 7 and 8) on the AMP circuit board. The positive side should be connected to the No. 8 terminal and the negative side to the No. 7 terminal.
5) Adjust L channel by turning the trap coil L11 for minimum reading on V.T.V.M.
6) Set V.T.V.M. to 3 – 1 mV range.
7) Connect the leads of V.T.V.M. to the No. 40 terminal and the test point TP-1 on the AMP circuit board. The positive side should be connected to TP-1 and the negative side should be connected to TP-1 and the negative side to the No. 40 terminal.
8) Adjust R channel by turning the trap coil L2 for minimum reading on V.T.V.M.
9) Connect the leads of V.T.V.M. to the No. 7 terminal and the test point TP-2 on the AMP circuit board. The positive side should be connected to TP-2 and the negative side to the No. 7 terminal.
10) Adjust L channel by turning the trap coil L1 for minimum reading on V.T.V.M.

B. Bias Adjustment

- Test instrument connection diagram

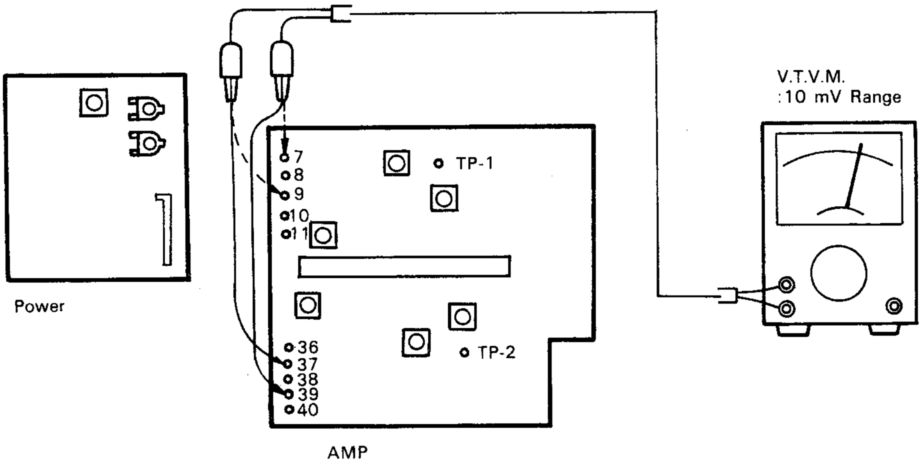

V.T.V.M.
:10 mV Range
Power
7
8
9
10
11
TP-1
36
37
38
39
40
TP-2
AMP

Fig. 3

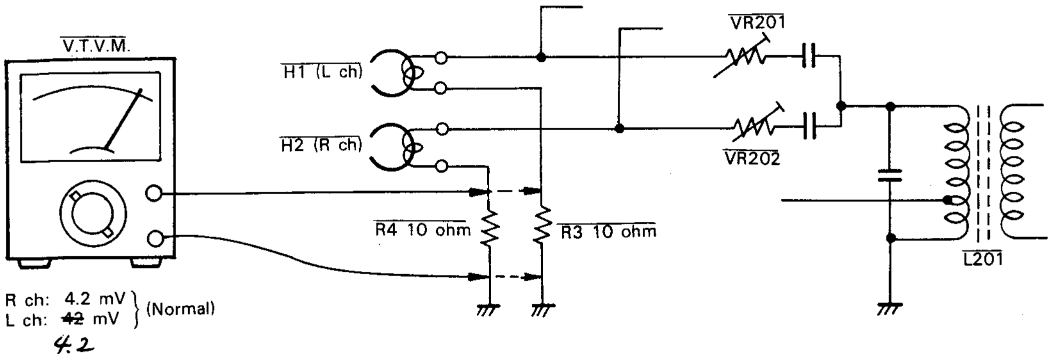

V.T.V.M.
H1 (L ch)
H2 (R ch)
VR201
VR202
R4 10 ohm
R3 10 ohm
L201
R ch: 4.2 mV
L ch: ~~42~~ mV
(Normal)
4.2

Fig. 4

NOTE: Set the EQ/Bias switch to NORMAL position.

- Connection of test instrument

  Connect V.T.V.M. as shown in Fig. 3. For adjustment of L channel, connect it to the terminals (No. 7 and 9) on the AMP circuit board. For R channel, connect it to the terminals (No. 38 and 40).

- Voltage adjustment
  - * Standard voltage for each type of tape is shown below:

Tape / Ch	FeCr	Normal	CrO_2
Rch	5.5 mV	4.2 mV	6 mV
Lch	5.5 mV	4.2 mV	6 mV

- Adjustment procedures
  1. Operate the unit in recording mode, with the EQ/Bias switch in NORMAL position.
  2. Set V.T.V.M. to 10 mV range, and connect the positive lead to the No. 38 terminal on the AMP circuit board and the negative lead to the No. 40 terminal (Rch).
  3. Turn the semi-fixed resistor VR202 to adjust the bias voltage of R channel for 4.2 mV on V.T.V.M.
  4. Next, connect the V.T.V.M. to L channel. The positive lead should be connected to the No. 9 terminal and the negative lead to the No. 7 terminal on the AMP circuit board.
  5. Turn the semi-fixed resistor VR201 to adjust the bias voltage of L channel for 4.2 mV on V.T.V.M.

NOTE: Bias voltage for FeCr and CrO_2 tapes is automatically set to the above value when adjusted at the NORMAL position.

C. Playback Sensitivity Adjustment

- Test instrument connection diagram

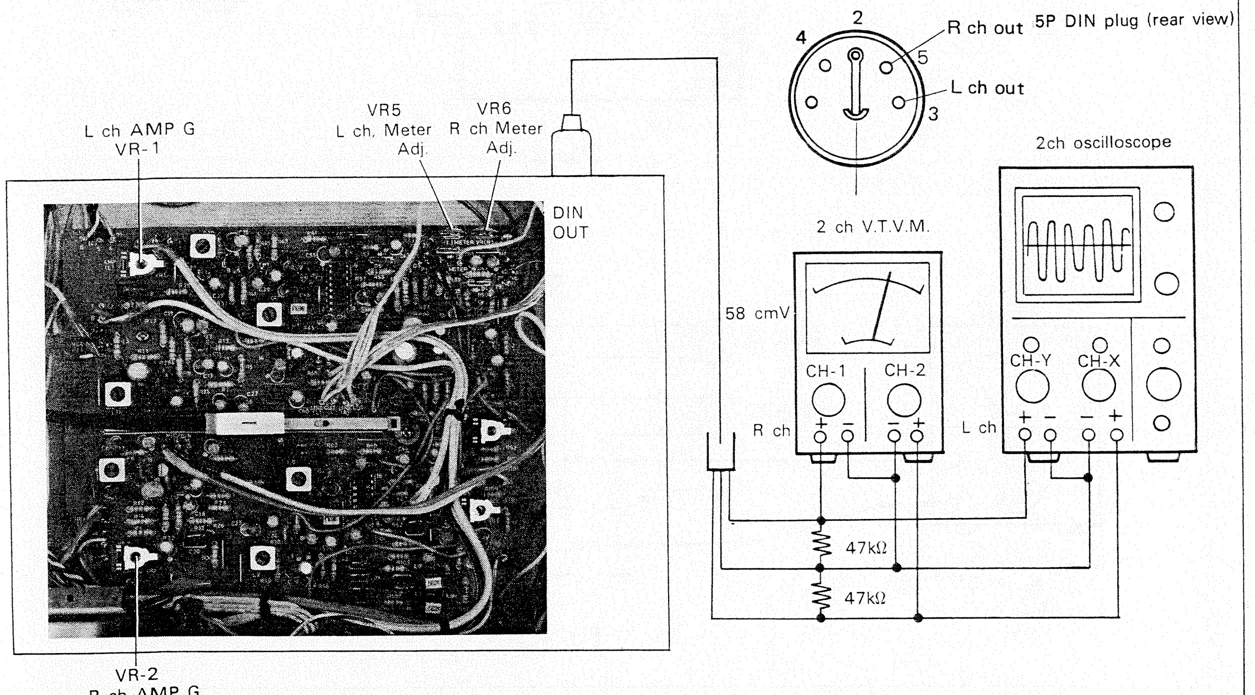

L ch AMP G
VR-1
VR5
L ch. Meter
Adj.
VR6
R ch Meter
Adj.
DIN
OUT
4
2
5
3
R ch out
L ch out
5P DIN plug (rear view)
2ch oscilloscope
2 ch V.T.V.M.
58 cmV
CH-1
CH-2
R ch
L ch
CH-Y
CH-X
47kΩ
47kΩ
VR-2
R ch AMP G

Fig. 5

- Test tape and test instruments
  - * Oscilloscope
  - * V.T.V.M.
  - * Test tape (MTT-150)
  - * Load resistor, 47kohm

Connect the test instruments as shown in Fig. 5. Then, connect the DIN cord to the DIN OUT SOCKET of the unit. (If 2-signal oscilloscope and 2ch V.T.V.M are not available, use single channel instruments to measure L and R channels separately.)

Output voltage

	Output voltage (V.T.V.M)
DIN OUT (Rch)	580 mV
DIN OUT (Lch)	580 mV

- Adjustment procedures
  1. Load test tape (MMT-150) and press the Play Button.
  2. Turn the semi-fixed resistors VR1 and VR2 so that V.T.V.M. indicates 580 mV for each channel. (Adjust L channel with VR1 and R channel with VR2.)

D. Meter Adjustment

- Connect the test instruments the same as in "Sensitivity Adjustment".

- Adjustment procedures
  1. Load test tape (MMT-150) in the unit and press the Play Button.
  2. Adjust the semi-fixed resistors VR5 and VR6 until the meter of the unit (CTD-2200) indicates 0 VU.
     Adjust L channel with VR5 and R channel with VR6, each for 0 VU.

E. Azimuth Adjustment

- Test instrument connection digram

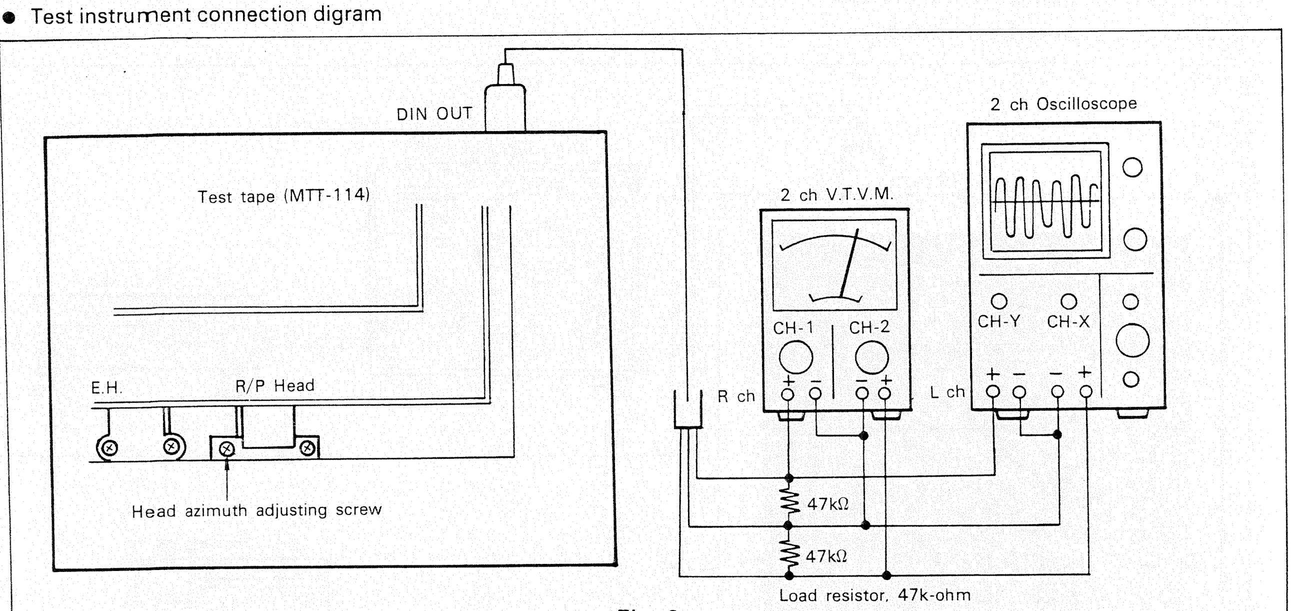
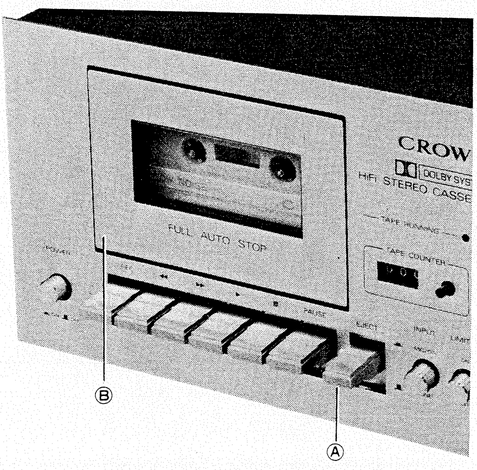

DIN OUT
Test tape (MTT-114)
E.H.
R/P Head
Head azimuth adjusting screw
2 ch V.T.V.M.
CH-1
CH-2
R ch
L ch
2 ch Oscilloscope
CH-Y
CH-X
47kΩ
47kΩ
Load resistor, 47k-ohm

Fig. 6

- Connection of test instruments

  Connect V.T.V.M., oscilloscope and load resistor (47k-ohm) as shown in Fig.   Load test tape (MTT-114) in the unit and connect DIN cord to DIN OUT socket.


CROW
DOLBY SYS
HiFi STEREO CASSE
FULL AUTO STOP
TAPE COUNTER
Ⓑ
Ⓐ

- Adjustment procedures
  1. Press the Eject Button (A in Photo) to open the cassette lid.
  2. Remove the cassette lid (for removal, refer to page 3).
  3. Load test tape (MTT-114) in the cassette holder and close the lid.
     Press the Play Button and the head azimuth adjusting screw (Fig. 6) will be viewed between the cassette holder and the case.
  4. Turn the head azimuth adjusting screw until V.T.V.M. indicates a maximum reading.
  5. While observing the readings of Ch-1 and Ch-2 on V.T.V.M., confirm that the difference between the readings is within 3 dB. If required, readjust the head azimuth until it falls in 3 dB.
  6. After the adjustment, lock the azimuth adjusting screw with bond (DB-1600).

F. Dolby Check

- Connect the test instruments the same as in "Head Azimuth Adjustment" in Item E.

- Check method
  1. Load test tape (MTT-114) in the unit and press the Play Button. Assume that the reading obtained on V.T.V.M. is 0 dB.
  2. Set the Dolby switch to ON and check that the output does not fall more than 1 dB. Also, check that the output difference between L and R channels is within 1 dB.

G. Recording Sensitivity Adjustment

- Test instrument connection diagram

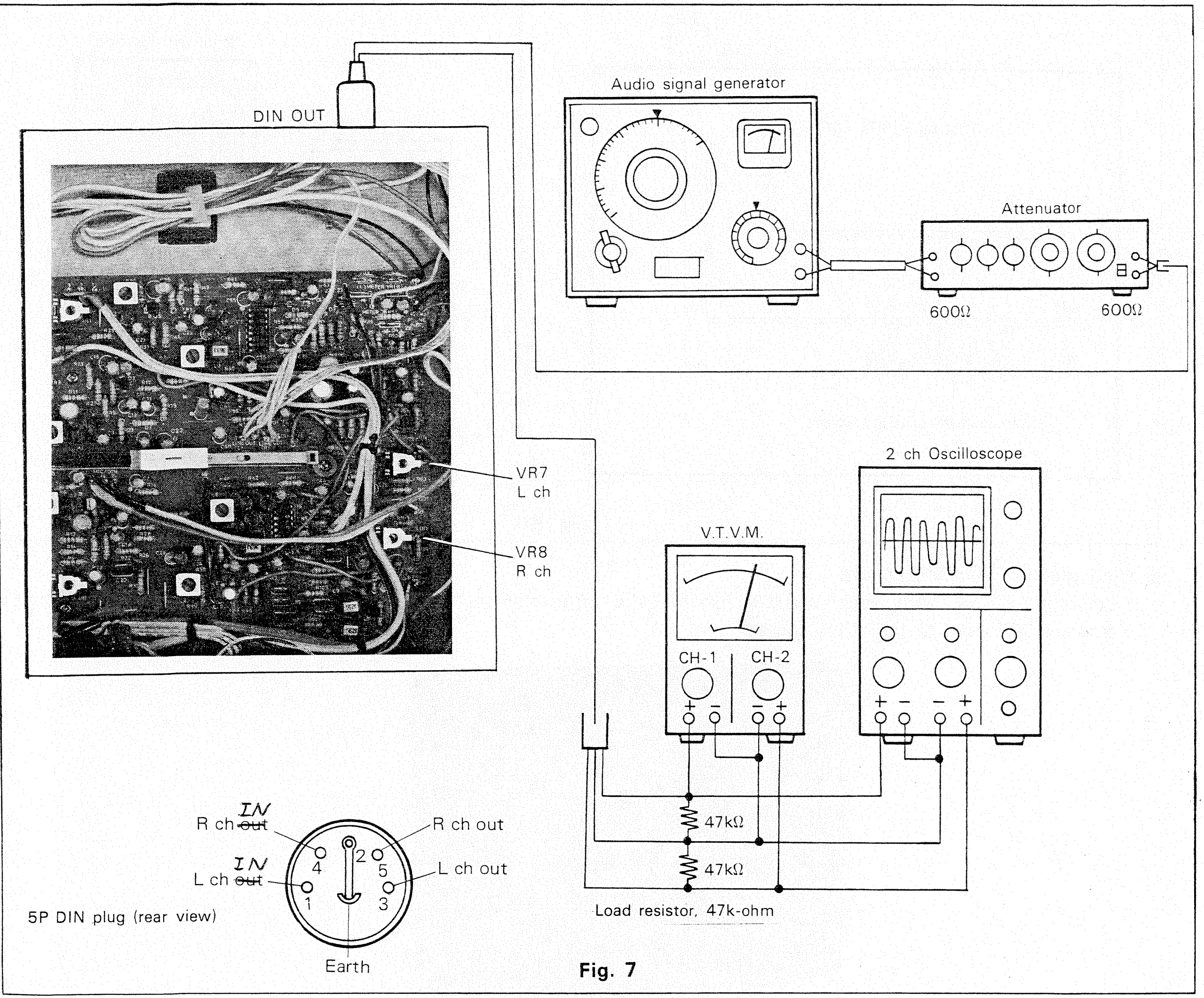

DIN OUT
Audio signal generator
Attenuator
600Ω
600Ω
VR7
L ch
VR8
R ch
2 ch Oscilloscope
V.T.V.M.
CH-1
CH-2
R ch ~~out~~ IN
L ch ~~out~~ IN
R ch out
L ch out
4
2
5
1
3
5P DIN plug (rear view)
Earth
47kΩ
47kΩ
Load resistor, 47k-ohm

Fig. 7

- Connection of test instruments

  Connect the audio signal generator, V.T.V.M., oscilloscope, attenuator and load resistor (47k-ohm) as shown in Fig. 7. Load blank tape (AM-N-221) in the unit and connect DIN cord to DIN OUT (IN) socket.

- Voltage

Ch	Input frequency	Input voltage	Output voltage
R channel	1 kHz	−6 dB	460 mV
L channel	1 kHz	−6 dB	460 mV

- Adjustment procedures
  1. Set the audio signal generator to 1 kHz. Adjust the output to 1V with the attenuator set to −6 dB.
  2. Load a normal tape (blank tape AM-N-221) and set the unit in recording mode, with EQ/Bias switch set in NORMAL position.
  3. Adjust the REC volume control of the unit until the meter of the unit indicates −2 VU.
  4. After recording, rewind the tape for playback. Adjust the semi-fixed resistors VR7 and VR8 so that V.T.V.M. indicates 460 mV of playback output.
     Adjust VR7 and VR8 while recording and playing repeatedly until the output voltage reaches 460 mV.
     Adjust R channel for 460 mV with VR8 and L channel for 460 mV with VR7.

H. 19 kHz Trap Coil Adjustment

- Test instrument connection diagram

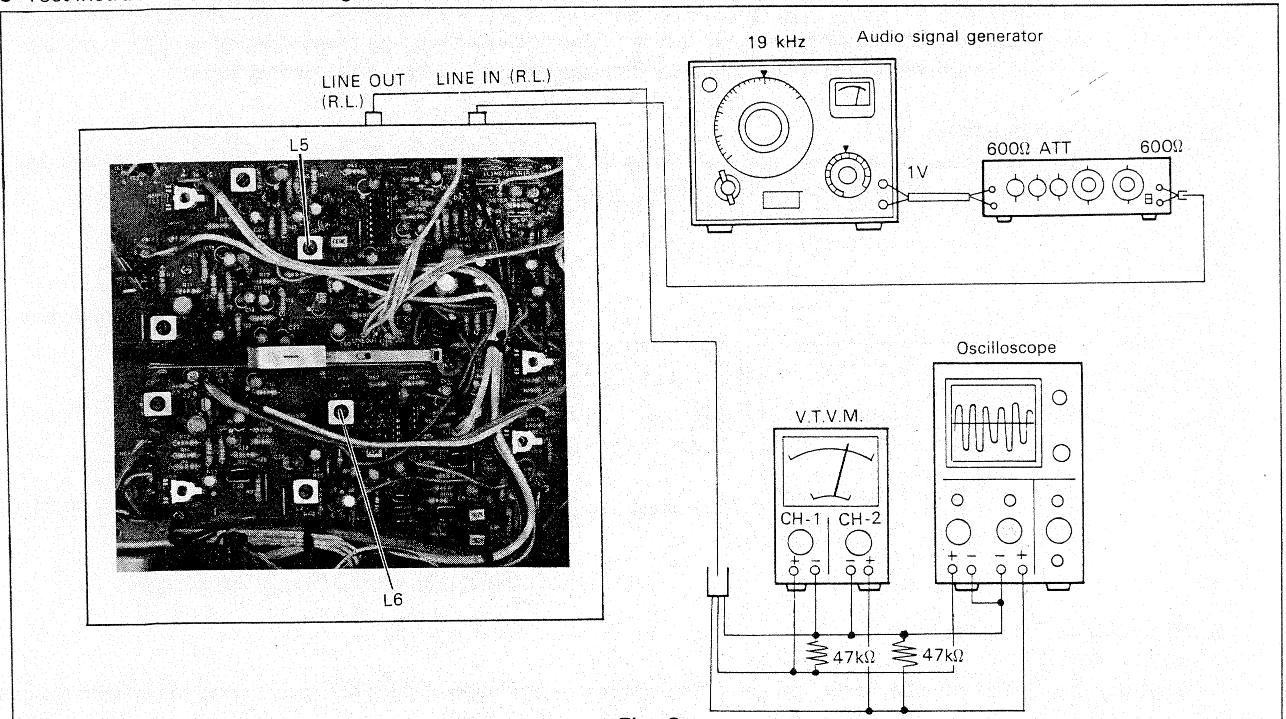


Fig. 8

- Connection of test instrument
  Connect the audio signal generator, oscilloscope, attenuator, V.T.V.M. and load resistor (47k-ohm) as shown in Fig. 8. Connect the attenuator output to LINE IN. Also, connect V.T.V.M. and oscilloscope to LINE OUT.

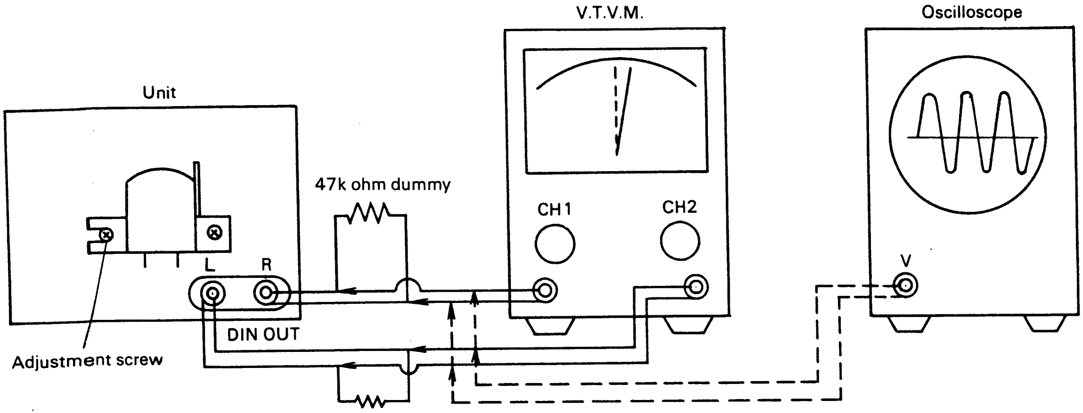
- Voltage adjustment
  Turn the trap coils L5 and L6 for minimum reading.

- Adjustment procedure
  1. Set the audio signal generator to 19 kHz and set the attenuator to −20 dB.
  2. Set the unit in recording mode. Turn the trap coils L5 and L6 for minimum reading on V.T.V.M.
     Adjust Rch for minimum reading with the trap coil L6. Adjust Lch for minimum reading with the trap coil L5.

MECHANICAL ADJUSTMENT

1. Head Azmuth Adjustment

With V.T.V.M. connected to L and R channels SP OUT, play a standard tape (10 kHz, − 10 dB). Turn the head azimuth adjusting screw for a maximum and same reading on L and R channels V.T.V.M. After the adjustment, secure the screw with a locking paint.

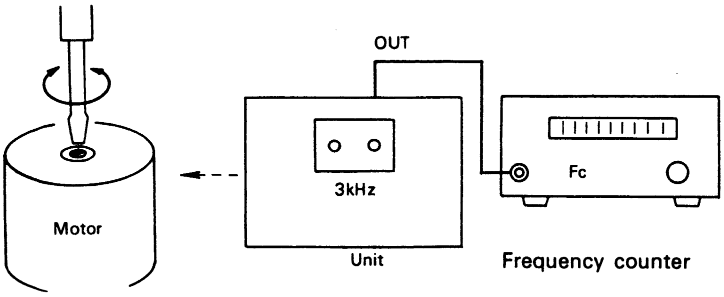


NOTE: Tape Head Demagnetization

The tape head may be magnetized if a magnetized tool is brought close to it or the tape deck is used for an extended period of time. When the head is magnetized, the result is a loss of high frequency or an increase of noise in tape. Magnetized tape head should be demagnetized by using a head demagnetizer.

2. Tape Speed Adjustment

With V.T.V.M. connected to Earphone Jack, play a standard tape (f = 3 kHz). Insert a screwdriver through the adjusting hole on the motor and adjust the semi-fixed resistor until the frequency counter reads 3 kHz.



- Speed deviation can be obtained from the following formula:

$$X = \frac{3000 - FC}{3000} \times 100 = \%$$

where X: Speed deviation (%)
FC: Reading on frequency counter (Hz)

3. Pinch Roller Pressure

400 ~ 600 g

Read the value indicated on a tension gauge at the point where revolution of the pinch roller comes to half with the gauge pressed onto it.

4. Take-up Torque

40 ~ 70 g-cm

Measure on the take-up reel platform operating in play. If less than 40 g-cm, check to see if it is caused by slippage between the reel platform and the play idler.

a. If found to be slipping, wipe and clean the rubber portion of the take-up reel platform and the pulley of the drive roller assembly, using alcohol.

b. If the reel platform itself is the cause of the slippage replace the reel base unit.

5. Rewind Torque

Better than 70 g-cm

Measure the torque on the supply reel platform operating in REW. If less than 40 g-cm, clean the supply reel platform, REW idler assembly, REW pulley assembly, drive belt and flywheel with alcohol.

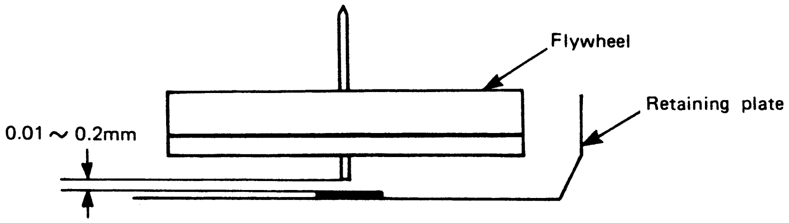
6. F.F Torque

Better than 70 g-cm

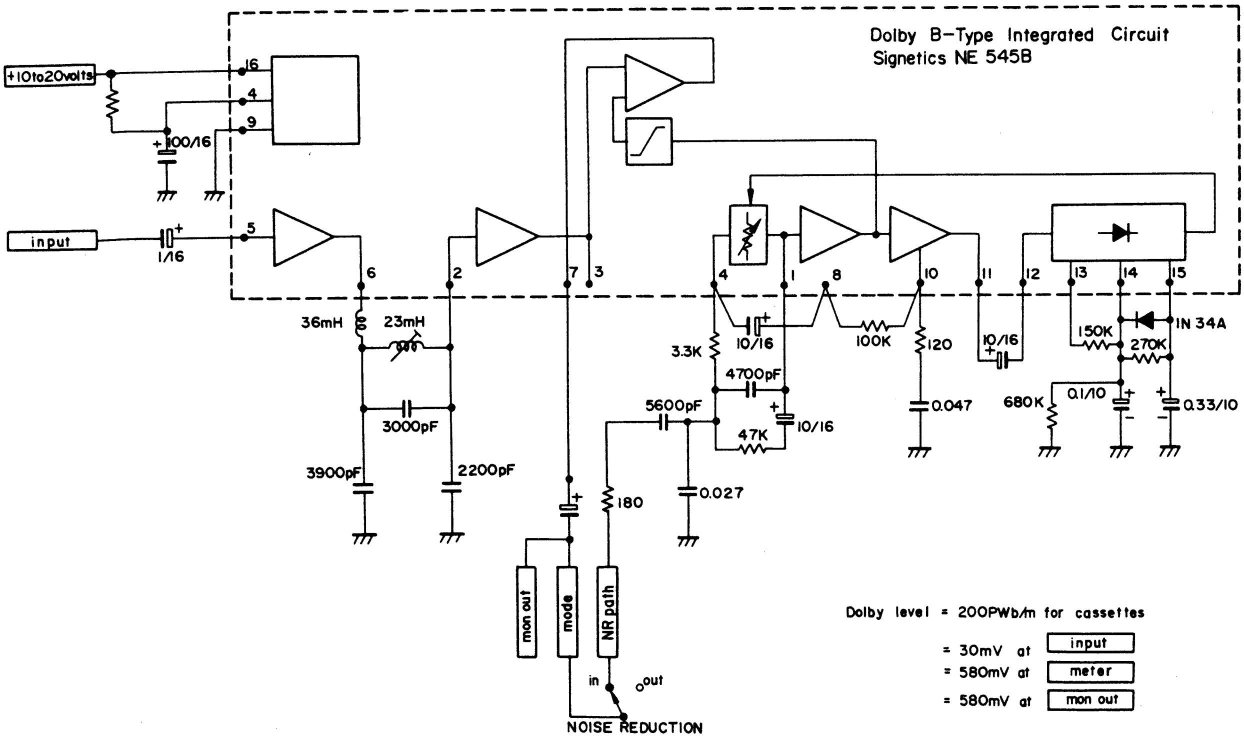
Measure the torque on the take-up reel platform operating in F.FWD. If less than 40 g-cm, check to see if it is caused by slippage between the reel platform and the play idler. If found to be slipping, clean the rubber portion of the take-up reel platform, the flywheel and the F.F idler with alcohol.

7. Gap Adjustment

The gap between the center shaft of the flywheel and the flywheel retaining plate should be adjusted within the range of 0.01 to 0.2 mm.


Flywheel
Retaining plate
0.01 ~ 0.2mm

IC (NE-545B) SYSTEM BLOCK DIAGRAM


Dolby B-Type Integrated Circuit
Signetics NE 545B
+10to20volts
16
4
9
+100/16
input
1/16
5
6
2
7
3
4
1
8
10
11
12
13
14
15
36mH
23mH
3000pF
3900pF
2200pF
3.3K
10/16
4700pF
5600pF
10/16
47K
0.027
180
100K
120
0.047
10/16
680K
0.1/10
150K
270K
IN 34A
0.33/10
mon out
mode
NR path
in
out
NOISE REDUCTION

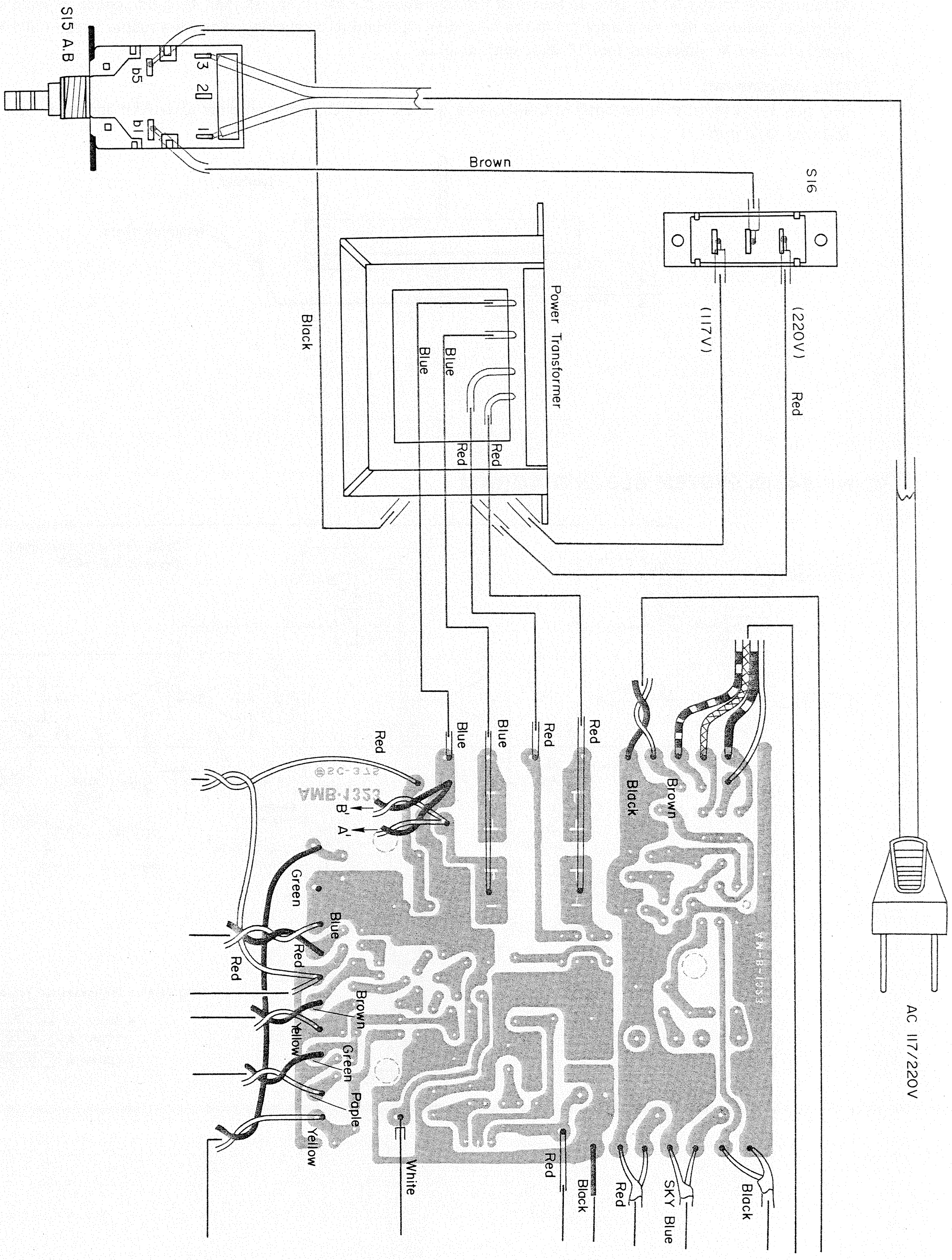
Dolby level = 200PWb/m for cassettes

= 30mV at input

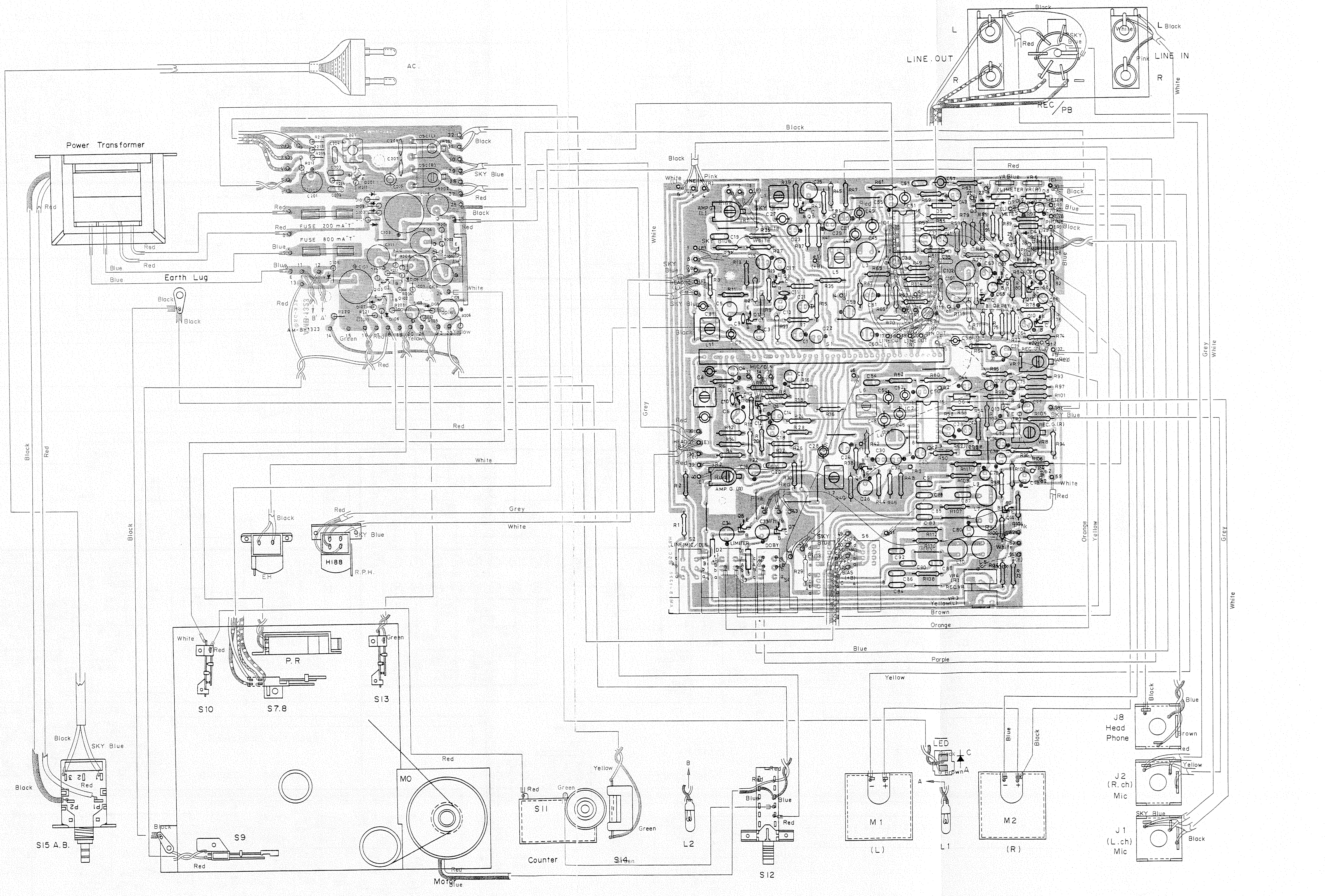
= 580mV at meter

= 580mV at mon out

LEED CONNECTION —1— (POWER SUPPLY)

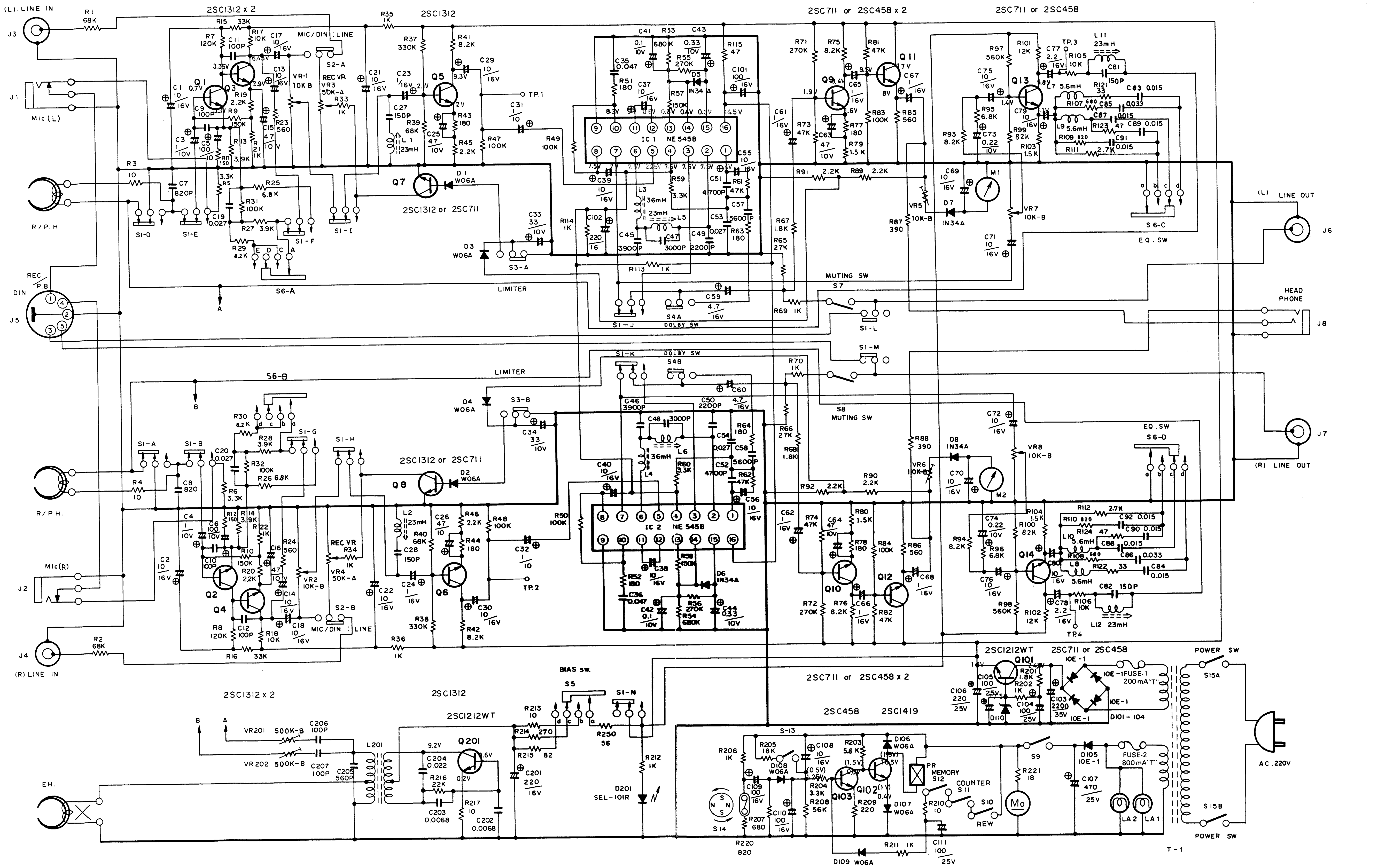

S15 A.B
3
2
1
b5
b1
Brown
S16
Power Transformer
(117V)
(220V)
Red
Black
Blue
Blue
Red
Red
AC 117/220V
Red
Blue
Blue
Red
Red
Black
Brown
AMB-1323
B'
A'
Green
Blue
Red
Red
Brown
Yellow
Green
Paple
Yellow
White
Red
Black
Red
SKY Blue
Black

LEAD CONNECTION -2-

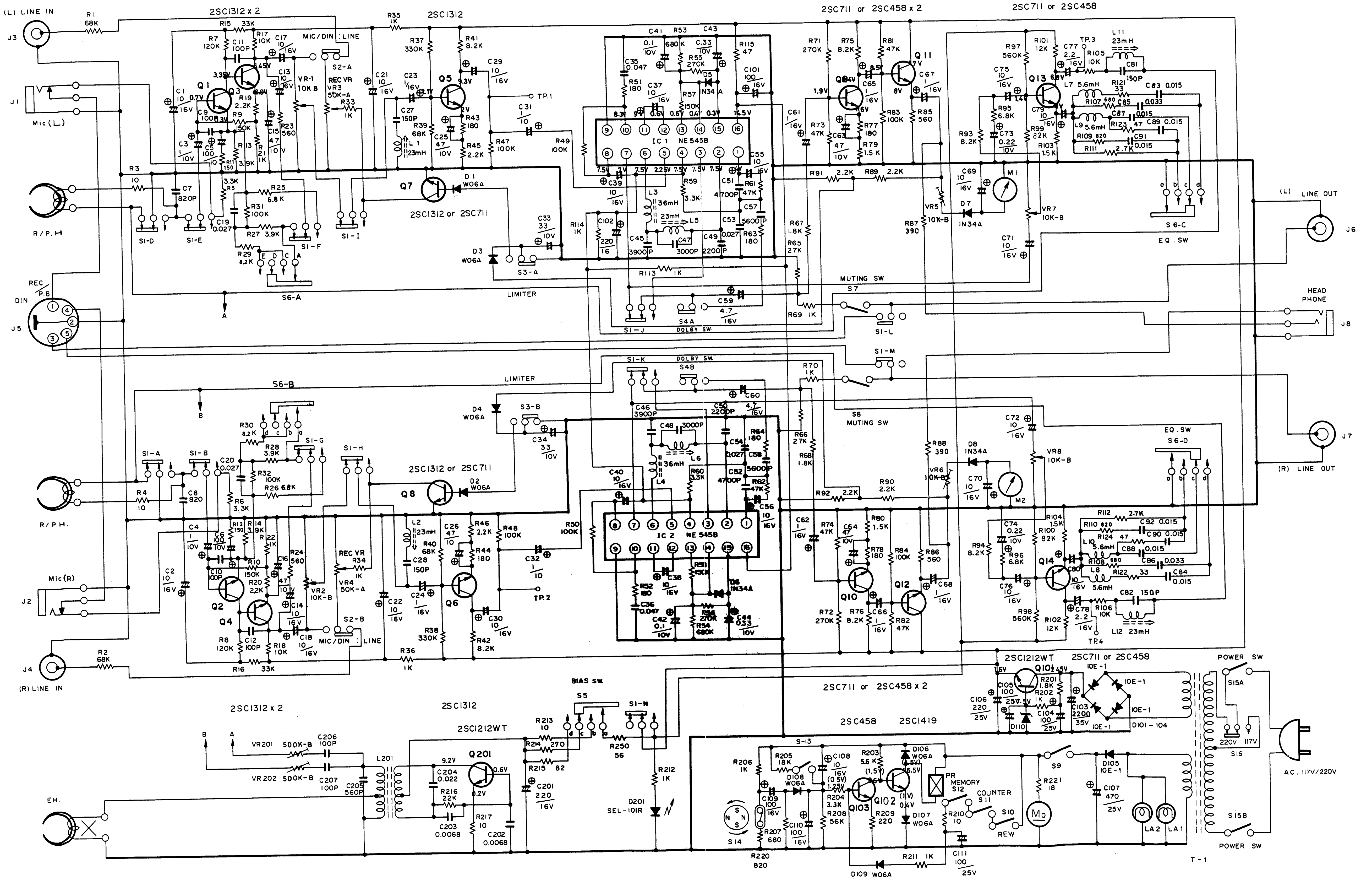

AC.
Power Transformer
FUSE 200 mA "T"
FUSE 800 mA "T"
Earth Lug
LINE OUT
LINE IN
L
R
REC/PB
EH
H188
R.P.H.
P.R
S10
S7.8
S13
S9
MO
Motor
S11
Counter
S14
L2
S12
S15 A.B.
M1
(L)
L1
M2
(R)
LED
J8
Head Phone
J2
(R.ch)
Mic
J1
(L.ch)
Mic
Black
Red
Blue
White
Grey
SKY Blue
Pink
Yellow
Green
Brown
Orange
Purple

SCHEMATIC DIAGRAM -1-

CTD 2200

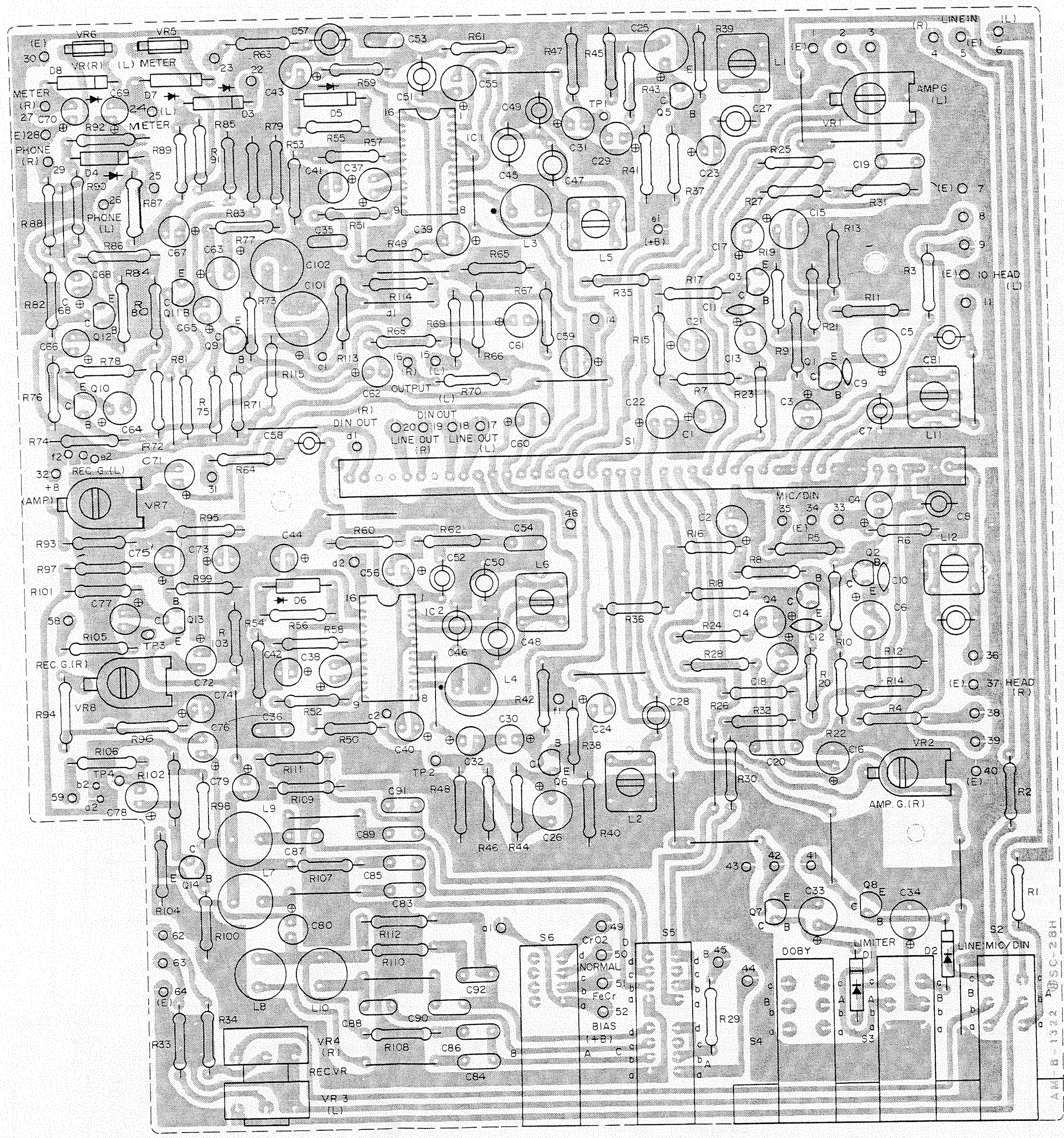

(L) LINE IN
J3
R1 68K
J1
Mic (L)
R/P.H
REC
P.B
DIN
J5
R/P.H.
Mic(R)
J2
J4
(R) LINE IN
R2 68K
EH.
2SC1312 x 2
2SC1312
2SC711 or 2SC458 x 2
2SC711 or 2SC458
Q1
Q3
Q5
Q7
2SC1312 or 2SC711
Q2
Q4
Q6
Q8
Q9
Q11
Q13
Q10
Q12
Q14
IC 1 NE 545B
IC 2 NE 545B
MIC/DIN : LINE
S2-A
S2-B
REC VR
VR3 50K-A
VR-1 10K B
VR2 10K-B
VR4 50K-A
TP.1
TP.2
TP.3
TP.4
D1 W06A
D2 W06A
D3 W06A
D4 W06A
D5 IN34A
D6 IN34A
D7 IN34A
D8 IN34A
S1-D
S1-E
S1-F
S1-I
S1-A
S1-B
S1-G
S1-H
S1-J
S1-K
S1-L
S1-M
S1-N
S3-A
S3-B
S4A
S4B
S6-A
S6-B
S6-C
S6-D
LIMITER
DOLBY SW
MUTING SW
S7
S8
M1
M2
VR5 10K-B
VR6 10K-B
VR7 10K-B
VR8 10K-B
EQ.SW
L11 23mH
L12 23mH
(L) LINE OUT
J6
J7
(R) LINE OUT
HEAD PHONE
J8
BIAS SW.
S5
R250 56
R212 1K
D201 SEL-101R
2SC1212WT
Q201
L201
VR201 500K-B
VR202 500K-B
C206 100P
C207 100P
C205 560P
C204 0.022
R216 22K
C203 0.0068
R217 10
C202 0.0068
C201 220 16V
R213 10
R214 270
R215 82
2SC1212WT
2SC711 or 2SC458
Q101
2SC711 or 2SC458 x 2
2SC458
2SC1419
Q102
Q103
S-13
D101 - 104
10E-1
10E-1FUSE-1 200mA"T"
FUSE-2 800mA"T"
D105 10E-1
D106 W06A
D107 W06A
D108 W06A
D109 W06A
D110
PR MEMORY S12
COUNTER S11
S10
REW
S9
R221 18
Mo
C107 470 25V
LA2
LA1
S14
POWER SW
S15A
S15B
T-1
AC.220V
C111 100 25V
R211 1K
R220 820
A
B

SCHEMATIC DIAGRAM -2-



(L) LINE IN
J3
R1 68K
J1
Mic (L)
R/P.H
REC P.B
DIN
J5
R/P.H.
Mic(R)
J2
J4
(R) LINE IN
EH.
2SC1312 x 2
R15 33K
R7 120K
C11 100P
R17 10K
C17 10 16V
MIC/DIN : LINE
S2-A
Q1
Q3
C1 10 16V
C9 100
R19 2.2K
R9 150K
C13 10 16V
VR-1 10K B
REC VR VR3 50K-A
R33 1K
C3 10V
C5 100
R11 150
R13 3.9K
C15 47
R21 1K
R23 560
R3 10
C7 820P
R5 3.3K
R25 6.8K
R31 100K
C19 0.027
R27 3.9K
R29 8.2K
S1-D
S1-E
S1-F
S1-I
S6-A
A
R35 1K
2SC1312
R37 330K
R41 8.2K
Q5
C21 10 16V
C23 1 16V
C27 150P
L1 23mH
R39 68K
C25 47 10V
R43 180
R45 2.2K
C29 10 16V
TP.1
C31 1 10
R47 100K
Q7
D1 W06A
2SC1312 or 2SC711
C33 33 10V
D3 W06A
S3-A
LIMITER
R49 100K
C41 R53 C43
C35 0.047
R51 180
C37 10 16V
R55 27K
D5 IN34A
R57 150K
R115 47
C101 100 16V
IC 1 NE 545B
C55 16V
C39 10 16V
L3 36mH
R59 3.3K
C51 4700P
R61 47K
C57 5600P
L5 23mH
C45 3900P
C47 3000P
C49 2200P
C53 0.027
R63 180
R114 1K
C102 220 16
R113 1K
C59 4.7 16V
S1-J
S4A DOLBY SW
2SC711 or 2SC458 x 2
R71 270K
R75 8.2K
R81 47K
Q11
Q9
C65 1 16V
C67 1 16V
C61 1 16V
R73 47K
C63 47 10V
R77 180
R79 1.5K
R83 100K
R85 560
R91 2.2K
R89 2.2K
R67 1.8K
R65 27K
R69 1K
MUTING SW S7
S1-L
S1-M
VR5 10K-B
R87 390
D7 IN34A
C69 10 16V
M1
VR7 10K-B
C71 10 16V
2SC711 or 2SC458
R97 560K
R101 12K
C77 2.2 16V
TP.3
R105 10K
L11 23mH
C81 150P
C75 10 16V
Q13
L7 5.6mH
R121 33
C83 0.015
R95 6.8K
R107 680
C85 0.033
R93 8.2K
C73 0.22 10V
C79 10 16V
R99 82K
L9 5.6mH
R123 47
C87 0.015
C89 0.015
R109 820
R111 2.7K
C91 0.015
R103 1.5K
S6-C
EQ. SW
(L) LINE OUT
J6
HEAD PHONE
J8
J7
(R) LINE OUT
S6-B
B
R30 8.2K
R28 3.9K
S1-G
S1-A
S1-B
C20 0.027
R32 100K
R26 6.8K
S1-H
R4 10
C8 820
R6 3.3K
C4 10V
C6 100 10V
R12 150
R14 3.9K
R22 1K
C16 47
R24 560
REC VR R34 1K
C2 10 16V
C10 100P
R10 150K
R20 2.2K
C14 10 16V
VR2 10K-B
VR4 50K-A
Q2
Q4
C12 100P
R18 10K
C18 10 16V
S2-B MIC/DIN : LINE
R8 120K
R16 33K
R2 68K
R36 1K
2SC1312 or 2SC711
Q8
D2 W06A
D4 W06A
S3-B
C34 33 10V
L2 23mH
R40 68K
C26 47 10
R46 2.2K
R48 100K
R44 180
C28 150P
C24 1 16V
Q6
C22 10 16V
R38 330K
C30 10 16V
R42 8.2K
C32 1 10
TP.2
R50 100K
S1-K DOLBY SW
S4B
C60 4.7 16V
C46 3900P
C50 2200P
C48 3000P
R64 180
C54 0.027
C58 5600P
L6 36mH
L4
R60 3.3K
C52 4700P
R62 47K
C40 10 16V
IC 2 NE 545B
C56 10 16V
C38 10 16V
R58 150K
D6 IN34A
R52 180
C36 0.047
C42 0.1 10V
R56 270K
R54 680K
C44 0.33 10V
R70 1K
S8 MUTING SW
R66 27K
R68 1.8K
R88 390
D8 IN34A
C72 10 16V
VR8 10K-B
EQ. SW S6-D
VR6 10K-B
C70 10 16V
M2
R92 2.2K
R90 2.2K
C62 1 16V
R74 47K
C54 47 10V
R80 1.5K
R78 180
R84 100K
R86 560
Q10
Q12
C68 1 16V
R72 270K
R76 8.2K
C66 1 16V
R82 47K
C74 0.22 10V
R94 8.2K
R96 6.8K
R100 82K
R104 1.5K
R112 2.7K
R110 820
C92 0.015
R124 47
C90 0.015
L10 5.6mH
C88 0.015
R108 680
C86 0.033
L8 5.6mH
R122 33
C84 0.015
Q14
C80 10 16V
C76 10 16V
R98 560K
R102 12K
C78 2.2 16V
R106 10K
C82 150P
L12 23mH
TP.4
2SC1212WT
2SC711 or 2SC458
Q101
10E-1
C105 100 25V
R201 1.8K
R202 1K
C106 220 25V
C103 2200 35V
C104 100 25V
D110
D101 - 104
POWER SW
S15A
220V 117V
S16
AC. 117V/220V
S15B
T-1
2SC711 or 2SC458 x 2
2SC458 2SC1419
S-13
R206 1K
R205 18K
C108 10 16V
R203 5.6K
D106 W06A
PR MEMORY S12
S9
R221 18
D105 10E-1
C107 470 25V
D108 W06A
COUNTER S11
Q103
Q102
R204 3.3K
R208 56K
R209 220
D107 W06A
R210 10
S10 REW
Mo
LA2 LA1
C109 100 16V
C110 100 16V
R207 680
S14
R220 820
R211 1K
C111 100 25V
D109 W06A
BIAS SW. S5
S1-N
R213 10
R214 270
R215 82
R250 56
R212 1K
D201 SEL-101R
2SC1312 x 2
2SC1312
2SC1212WT
VR201 500K-B
C206 100P
VR202 500K-B
C207 100P
L201
C205 560P
Q201
C204 0.022
R216 22K
C203 0.0068
R217 10
C202 0.0068
C201 220 16V

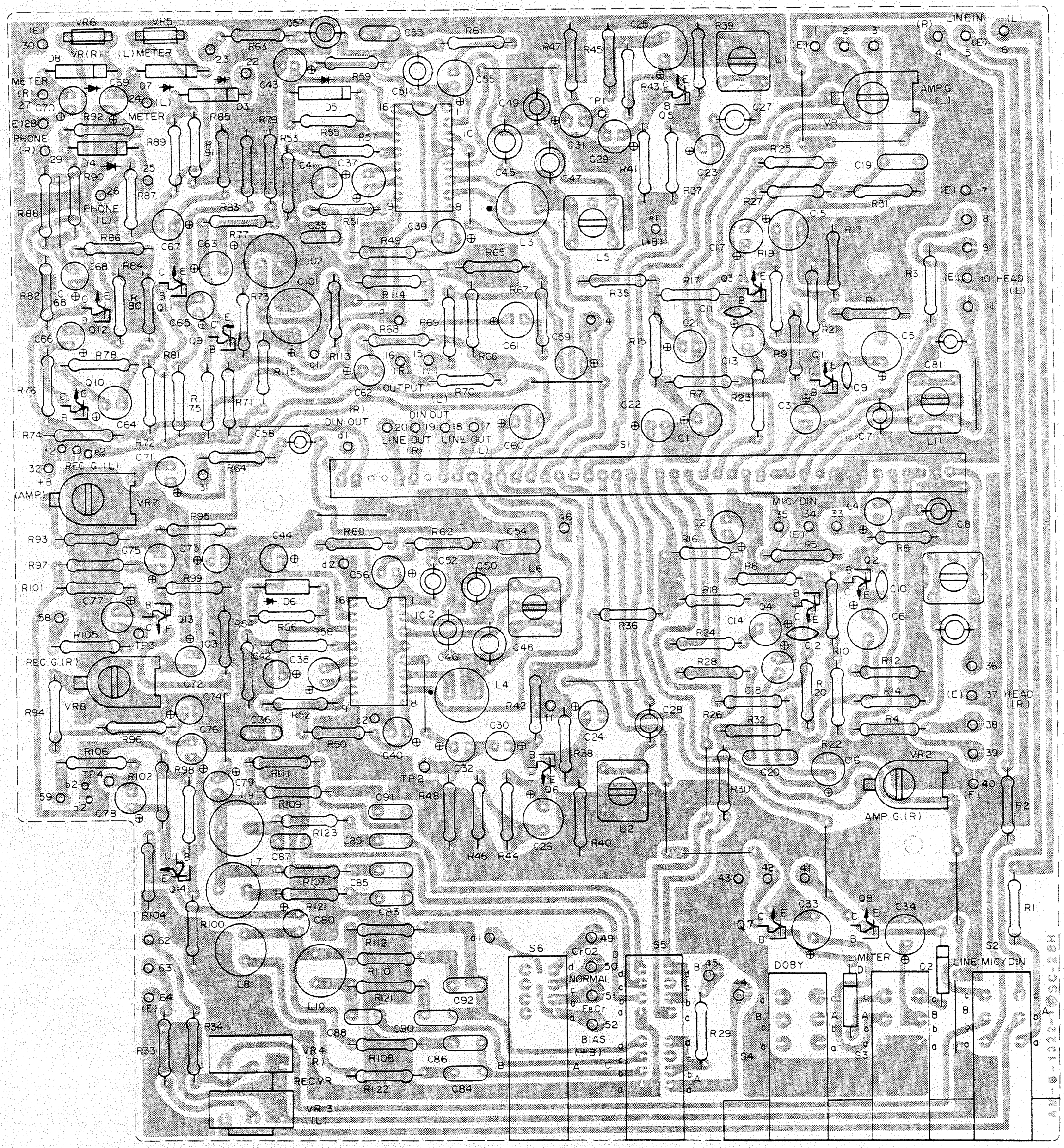
WIRING BOARD LAYOUT (AMP.) –1–


LINE IN
(R)
(L)
(E)
VR6
VR5
VR(R)
(L) METER
METER (R)
PHONE (R)
PHONE (L)
AMP G (L)
VR1
HEAD (L)
HEAD (R)
REC G (L)
REC G (R)
VR7
VR8
(AMP)
OUTPUT
DIN OUT
LINE OUT (R)
LINE OUT (L)
MIC/DIN
AMP. G. (R)
VR2
IC1
IC2
TP1
TP2
TP3
TP4
S1
S2
S3
S4
S5
S6
NORMAL
CrO2
FeCr
BIAS
DOBY
LIMITER
LINE MIC/DIN
VR4 (R)
REC.VR
VR 3 (L)
AM-B-1322 (SC-28H)

– 18A –

WIRING BOARD LAYOUT (AMP.) –2–

(NEW TYPE)


LINE IN
(R)
(L)
(E)
VR6
VR5
VR(R)
(L) METER
METER (R)
PHONE (R)
PHONE (L)
AMP G (L)
VR1
HEAD (L)
HEAD (R)
REC G (L)
REC G (R)
VR7
VR8
(AMP)
OUTPUT
DIN OUT
LINE OUT (R)
LINE OUT (L)
MIC/DIN
AMP. G. (R)
VR2
IC1
IC2
TP1
TP2
TP3
TP4
S1
S2
S3
S4
S5
S6
NORMAL
CrO2
FeCr
BIAS
DOBY
LIMITER
LINE/MIC/DIN
VR4 (R)
REC.VR
VR 3 (L)
AM-B-1322 (SC-28H)

– 18B –

REPLACEMENT PARTS LIST

1. AMP WIRING BOARD ASS'Y (9192400)

Symbol No.	Stock No.	Part No.	Description	Q'ty	Remarks
	7121322	AM-B-1322	Wiring Board	1	1-1
S1	7460647	AM-S-647	Slide Switch	1	
S2,3,4	7460626	AM-S-626	Push Switch	1	
S5	7460624	AM-S-624	Lever Switch	1	
S6	7460625	AM-S-624	Lever Switch	1	
VR1,2,7,8	7580670	AM-VR-670	Semifixed Resistor	4	
VR3,4	7580787	AM-VR-787	Variable Resistor	1	
VR3,4	7540863	AM-VR-863	Variable Resistor	1	New Type
VR5,6	7580826	AM-VR-826	Semifixed Resistor	1	
L1,2,5 6,11,12	7290493	AM-LS-493	Choke Coil	6	
L3,4	7290421	AM-LS-421	Choke Coil	2	
L7,8,9,10	7290450	AM-LS-450	Choke Coil	4	
	7660257	AM-YS-257	Ribbon Wire 3 (540 mm)	1	1-2
	7710203	AM-Z-203	Jumper Wire (12.5 mm)	21	1-3
	7740113	AM-ZE-113	Wiring Tip	45	1-4
	7740147	AM-ZE-147	Wiring Tip	5	1-5

IC SEMICONDUCTORS

Symbol No.	Stock No.	Description	Q'ty	Remarks
IC1,2	7200048	Integrated Circuit NE545B	2	
Q1,2,3,4,5,6	8113322	Transistor 2SC1312F	6	
Q7,8	8113323	Transistor 2SC1312G	2	
Q9,10,11,12,13,14	8113326	Transistor 2SC711E	6	
D1,2,3,4	8120066	Diode W06A	4	
D5,6,7,8	8121002	Diode 1N34A	4	

RESISTORS

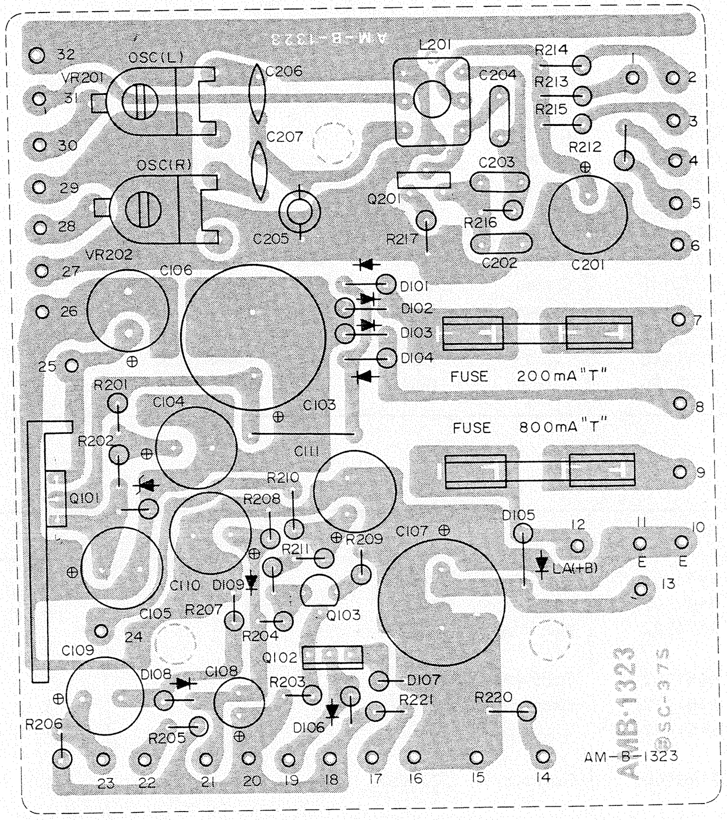
Symbol No.	Stock No.	Description	Q'ty	Remarks
R3,4	8300171	Carbon 10Ω (J) 1/4W CF	2	
R121,122	8300173	Carbon 33Ω (J) 1/4W CF	2	
R123,124	8300174	Carbon 47Ω (J) 1/4W CF	2	
R115	8333476	Carbon 47Ω (J) 1/2W RD	1	
R250	8323561	Carbon 56Ω (J) 1/4W RD	1	
R11,12	8300180	Carbon 150Ω (J) 1/4W CF	2	
R43,44,51,52,63,64 77,78	8300181	Carbon 180Ω (J) 1/4W CF	8	
R87,88	8300374	Carbon 390Ω (J) 1/4W CF	2	
R23,24,85,86	8300186	Carbon 560Ω (J) 1/4W CF	4	
R107,108	8300187	Carbon 680Ω (J) 1/4W CF	2	
R109,110	8300188	Carbon 820Ω (J) 1/4W CF	2	
R21,22,33,34,35,36 69,70,113,114	8300212	Carbon 1kΩ (J) 1/4W CF	10	
R79,80,103,104	8300191	Carbon 1.5kΩ (J) 1/4W CF	4	
R67,68	8300192	Carbon 1.8kΩ (J) 1/4W CF	2	
R19,20,45,46,89,90 91,92	8300193	Carbon 2.2kΩ (J) 1/4W CF	8	
R111,112	8300194	Carbon 2.7kΩ (J) 1/4W CF	2	
R5,6,59,60	8300195	Carbon 3.3kΩ (J) 1/4W CF	4	
R13,14,27,28	8300235	Carbon 3.9kΩ (J) 1/4W CF	4	
R25,26,95,96	8300198	Carbon 6.8kΩ (J) 1/4W CF	4	

Symbol No.	Stock No.	Description	Q'ty	Remarks
R29,30,41,42,75,76 93,94	8300199	Carbon 8.2kΩ (J) 1/4W CF	8	
R17,18,105,106	8300201	Carbon 10kΩ (J) 1/4W CF	4	
R101,102	8300202	Carbon 12kΩ (J) 1/4W CF	2	
R56,66	8300206	Carbon 27kΩ (J) 1/4W CF	2	
R15,16	8300210	Carbon 33kΩ (J) 1/4W CF	2	
R61,62,73,74,81,82	8300207	Carbon 47kΩ (J) 1/4W CF	6	
R1,2,39,40	8300303	Carbon 68kΩ (J) 1/4W CF	4	
R99,100	8300209	Carbon 82kΩ (J) 1/4W CF	2	
R31,32,47,48,49,50 83,84	8300301	Carbon 100kΩ (J) 1/4W CF	8	
R7,8	8300238	Carbon 120kΩ (J) 1/4W CF	2	
R9,10,57,58	8300236	Carbon 150kΩ (J) 1/4W CF	4	
R55,56,71,72	8300304	Carbon 270kΩ (J) 1/4W CF	4	
R37,38	8300214	Carbon 330kΩ (J) 1/4W CF	2	
R97,98	8300311	Carbon 560kΩ (J) 1/4W CF	2	
R53,54	8300305	Carbon 680kΩ (J) 1/4W CF	2	

CAPACITORS

Symbol No.	Stock No.	Description	Q'ty	Remarks
C23,24,61,62,65,66 67,68	8441100	Electrolytic 1μF 16V M	8	
C77,78	8441220	Electrolytic 2.2μF 16V M	2	
C59,60	8441470	Electrolytic 4.7μF 16V M	2	
C1,2,13,14,17,18 21,22,29,30,37,28, 39,40,55,56,69,70, 71,72,75,76,79,80	8441101	Electrolytic 10μF 16V M	24	
C101	8441102	Electrolytic 100μF 16V M	1	
C102	8441222	Electrolytic 220μF 16V M	1	
C33,34	8431331	Electrolytic 33μF 10V M	2	
C15,16,25,26,63,64	8431471	Electrolytic 47μF 10V M	6	
C5,6	8431102	Electrolytic 100μF 10V M	2	
C41,42	8920001	Aluminum 0.1μF 10V	2	
C73,74	8920002	Aluminum 0.2μF 10V	2	
C43,44	8920003	Aluminum 0.3μF 10V	2	
C3,4,31,32	8920005	Aluminum 1μF 10V	4	
C27,28,81,82	8663009	Styrol 150pF (J)	4	
C7,8	8663036	Styrol 820pF (J)	2	
C49,50	8663049	Styrol 2200pF (J)	2	
C47,48	8663057	Styrol 3000pF (J)	2	
C45,46	8663062	Styrol 3900pF (J)	2	
C51,52	8600002	Styrol 4700pF (G)	2	
C57,58	8600008	Styrol 5600pF (G)	2	
C9,10,11,12	8793102	Ceramic 100pF (J) 50V	4	
C83,84,87,88,89,90 91,92	8873153	Mylar (Non Inductive) 0.15μF 50WV	8	
C19,20,53,54	8873273	Mylar (Non Inductive) 0.27μF 50WV	4	
C85,86	8873333	Mylar (Non Inductive) 0.033μF 50WV	2	
C35,36	8873473	Mylar (Non Inductive) 0.047μF (J) 50WV	2	

WIRING BOARD LAYOUT (POWER SUPPLY)


AM-B-1323
OSC(L)
VR201
C206
L201
R214
C204
R213
R215
C207
OSC(R)
R212
C203
Q201
R216
VR202
C205
R217
C202
C201
C106
D101
D102
D103
D104
FUSE 200mA"T"
FUSE 800mA"T"
R201
C104
C103
R202
C111
Q101
R210
R208
D105
R209
C107
R211
LA(+B)
C110
D109
C105
R207
Q103
R204
C109
Q102
D108
C108
D107
R203
R221
R220
R206
R205
D106
AMB-1323
SC-375
1
2
3
4
5
6
7
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E
E

(9192646)

2. POWER SUPPLY WIRING BOARD ASS'Y ~~(91926480~~

Part with • mark are not attached to the model CTD-2200 (X).

CTD-2200 (E), CTD-2200 (GE)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
2-1	2335183	R7611-019	Heat Sink	1	
2-2	3211308		⊕ Screw w/Washer (Pan Head) 3 × 8 S/Z	1	
2-3	3510023		Nut 3 S/Z	1	
2-4	7121323	AM-B-1323	Wiring Board	1	
• 2-5	7150087	AM-D-87	Fuse Holder	4	
• 2-6	7150099	AM-D-99	Fuse (200 mA "T")	1	Fuse-1
• 2-7	7150122	AM-D-112	Fuse (800 mA "T")	1	Fuse-2
2-8	7270437	AM-LO-437	OSC Coil	1	L201
2-9	7580829	AM-VR-829	Semifixed Resistor	2	VR201, 202
2-10	7710203	AM-Z-203	Jumper	1	
2-11	7740113	AM-ZE-113	Wiring Tip	31	
2-12	7740147	AM-ZE-147	Wiring Tip	1	

∴ POWER SUPPLY WIRING BOARD ASS'Y (9219564) MODEL CTD-2200X

IC. SEMICONDUCTORS

Symbol No.	Stock No.	Description	Q'ty	Remarks
Q101, 201	8113316	Transistor 2SC1212C WT	2	
Q102	8113293	Transistor 2SC1419C	1	
Q103	8113109	Transistor 2SC458 DM	1	
D101, 102, 103, 104, 105	8120205	Diode 10E1	5	
D106, 107, 108, 109	8120066	Diode W06A	4	
D110	8120207	Zener Diode WZ-172	1	

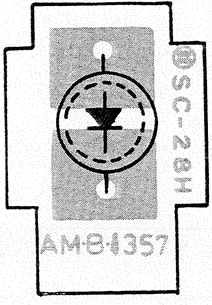
RESISTORS

Symbol No.	Stock No.	Description	Q'ty	Remarks
R221	8233181	Solid 18Ω (J) 1/2W RC	1	
R210,213,217	8300121	Carbon 10Ω (J) 1/4W UR	3	
R215	8300231	Carbon 82Ω (J) 1/4W UR	1	
R209	8300233	Carbon 220Ω (J) 1/4W UR	1	
R214	8300134	Carbon 270Ω (J) 1/4W UR	1	
R207	8300227	Carbon 680Ω (J) 1/4W UR	1	
R220	8300228	Carbon 820Ω (J) 1/4W UR	1	
R202,206,211,212	8300141	Carbon 1kΩ (J) 1/4W UR	4	
R201	8300142	Carbon 1.8kΩ (J) 1/4W UR	1	
R204	8300146	Carbon 3.3kΩ (J) 1/4W UR	1	
R203	8300154	Carbon 5.6kΩ (J) 1/4W UR	1	
R205	8300148	Carbon 18kΩ (J) 1/4W UR	1	
R216	8300149	Carbon 22kΩ (J) 1/4W UR	1	
R208	8300150	Carbon 56kΩ (J) 1/4W UR	1	

CAPACITORS

Symbol No.	Stock No.	Description	Q'ty	Remarks
C108	8441101	Electrolytic 10μF 16V M	1	
C109,110	8441102	Electrolytic 100μF 16V M	2	
C201	8441222	Electrolytic 220μF 16V M	1	
C104,105,111	8451102	Electrolytic 100μF 25V	3	
C106	8451222	Electrolytic 220μF 25V	1	
C107	8451472	Electrolytic 470μF 25V	1	
C103	7140140	Electrolytiv 2200μF 35V	1	AM-CS-140
C205	8663097	Styrol 560pF (J)	1	
C206,207	8793102	Ceramic 100pF (J) 50V	2	
C202,203	8873682	Mylar (Non Inductive) 0.0068μF 50WV	2	
C204	8873223	Mylar (Non Inductive) 0.022μF 50WV	1	

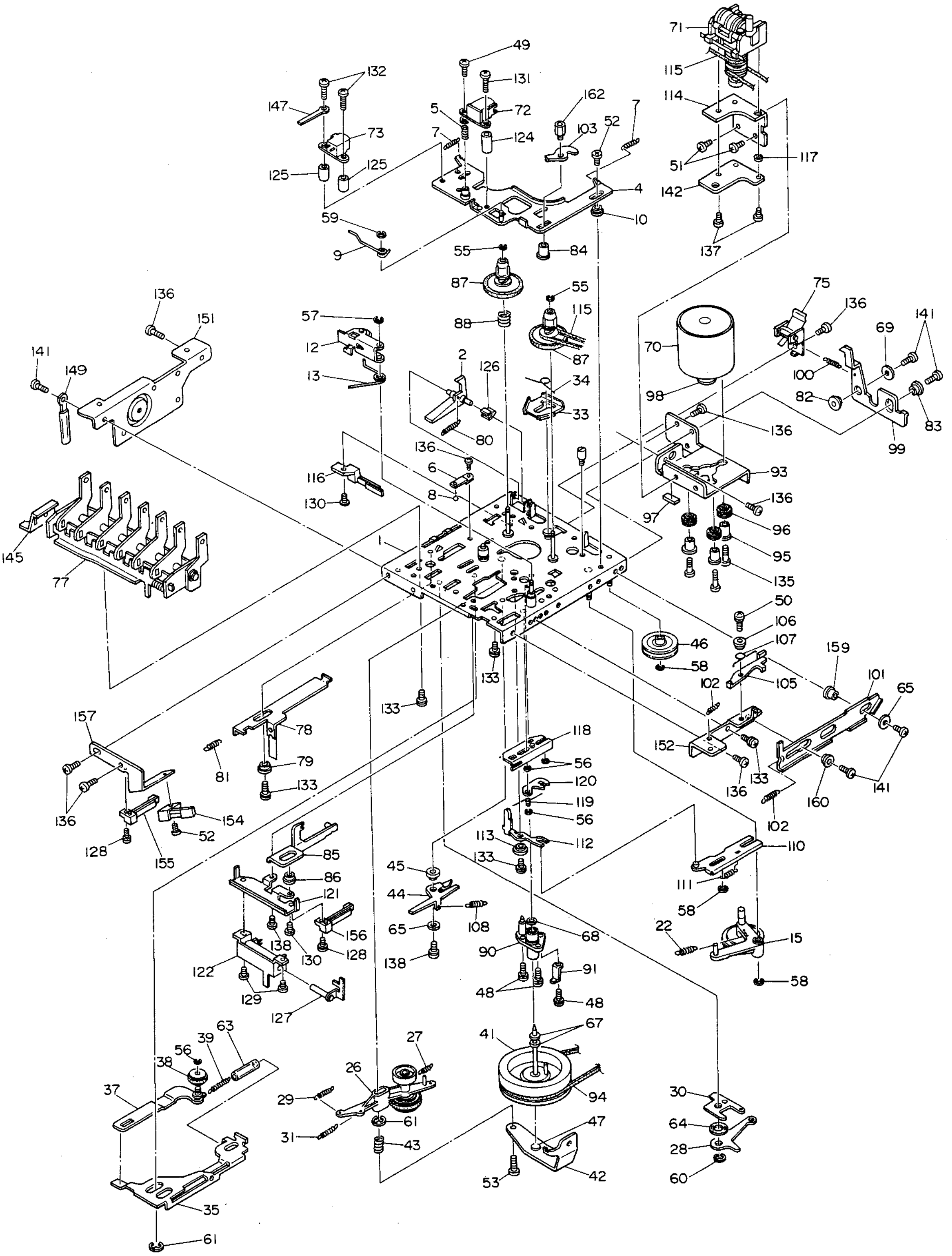
WIRING BOARD LAYOUT (LED)



3D. DIODE WIRING BOARD ASS'Y (9192703)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
3D-1	7121357	AM-B-1357	Wiring Board	1	
3D-2	8120152	SEL-101R	LED	1	

EXPLODED VIEW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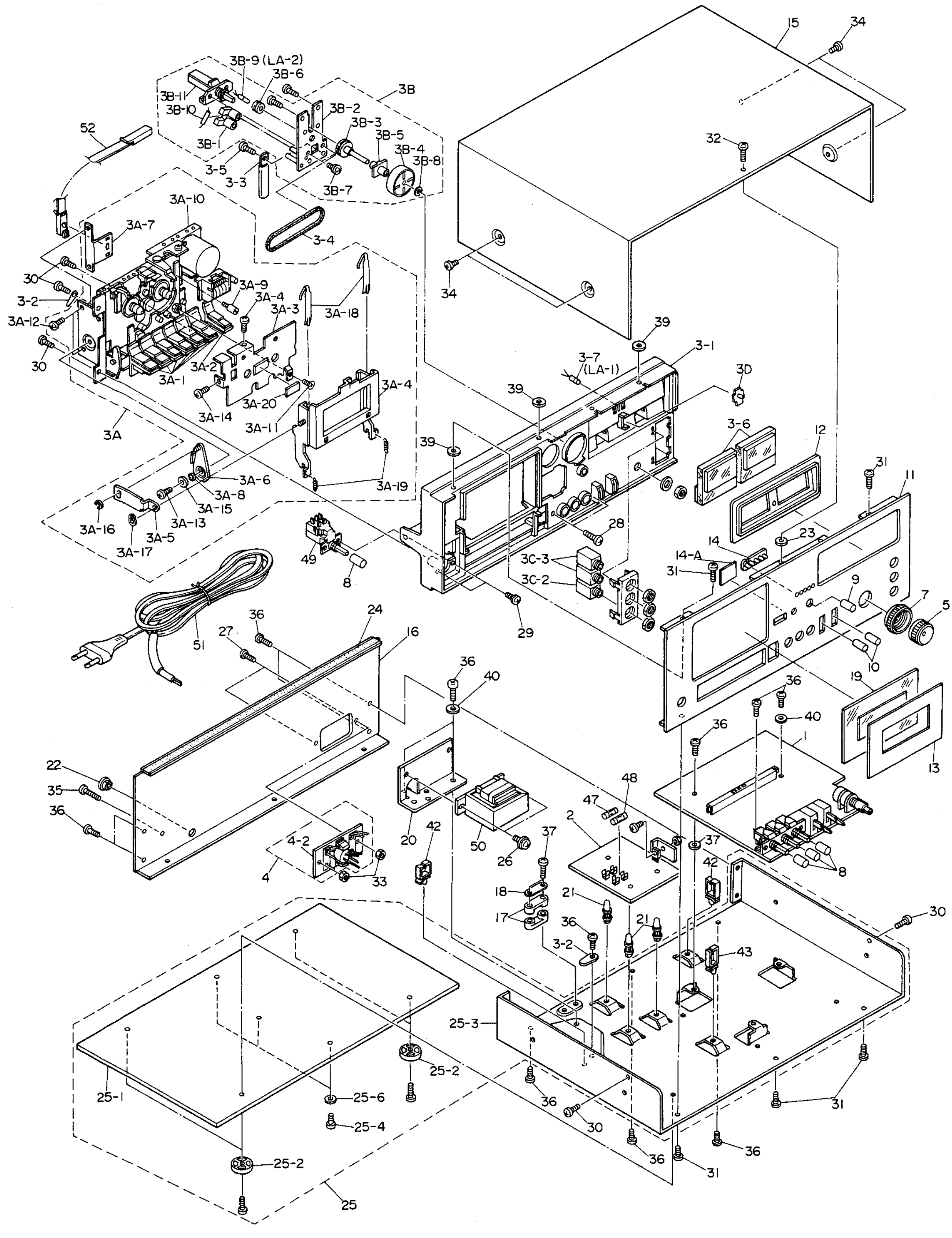
MECHANISM (CTD-2200)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
1	0002011	878-01-81	Chassis Ass'y	1	1104-01-91
2	0001484	268-05-03	REC Safety Lever Ass'y	1	1104-03-91
3					
4	0002014	1104-04-81	Sub Chassis Ass'y (Head Panel)	1	
5	0001494	48-04-08	Head Spring	1	
6	0002015	878-04-04	Flat Spring (Sub Chassis Holder)	1	
7	0001499	408-04-13	Spring (Sub Chassis)	1	
8	0002016	02-04-04	Ball Bearing	1	
9	0001579	408-04-05	RQ Spring	1	
10	0001848	408-04-11	Collar	1	
11					
12	0001666	715-07-81	Pinch Roller Unit	1	
13	0001974	668-05-01	Pinch Roller Spring	1	
14					
15	0002034	1029-06-91	Clutch Arm Ass'y	1	
16					
17					
18					
19					
20					
21					
22	0001505	238-04-06	Spring (Clutch Arm)	1	
23					
24					
25					
26	0001963	668-08-91	FF Arm Sub Ass'y	1	
27	0001230	58-13-16	Spring	1	
28	0001589	408-08-04	FF Operation Plate	1	
29	0001509	408-08-10	Spring	1	
30	0002033	1018-08-16	RWD Operation Plate	1	
31	0001509	408-08-10	Spring (RWD Operation Plate)	1	
32					
33	0001513	408-09-01	Brake Arm	1	
34	0001514	408-09-02	Spring (Brake Arm)	1	
35	0001592	408-09-03	Brake Operation Plate	1	
36					
37	0001593	408-10-81	RWD Idler Arm Ass'y	1	
38	0001517	211-09-02	RWD Idler	1	
39	0001578	02-09-05B	Spring (RWD Idler Arm)	1	
40					
41	0001522	58-09-03	Flywheel and Casptan	1	
42	0002028	800-11-93	Flywheel Holder Ass'y	1	
43	0001525	06-04-05	Spring (Thrust)	1	
44	0001594	408-14-05	Auto Lever	1	
45	0001969	998-14-01	Collar (Auto Lever)	1	
46	0001949	800-12-92	Pulley Ass'y	1	
47	0001831	630-09-02	Plate (Flywheel Holder)	1	
48	3211105		Screw w/Washer (Pan Head) M2 × 5	3	
49	0001495		⊕⊖ Screw (Pan Head) M2 × 6	1	
50	3211206		Screw w/Washer (Pan Head) M2.6 × 6	1	
51	3200001		Screw w/Washer (Pan Head) M2.6 × 4	2	Center Bracket × 2
52	3181204		Screw (Binding Head) M2.6 × 4	1	
53	3111210		Screw (Pan Head) M2.6 × 10	1	
54					
55	3721001		"E" Ring φ1.2	2	
56	3721002		"E" Ring φ1.5	5	
57	0001206		"E" Ring φ1.9	2	
58	3721003		"E" Ring φ2.0	2	
59	3721004		"E" Ring φ2.5	1	
60	3720010		"E" Ring φ3.2	1	
61	3721006		"E" Ring φ4.0	2	
62					
63	0001856		Vinyl Tube φ3 × 20L	1	(REW. SP × 1)
64	0001972	11-05-05	Nylon Washer φ4 × φ8 × 0.3t	2	
65	3711059	706-15-01	Washer φ2.6 × φ8 × 0.5t	2	
66	3711068		Washer M2	1	RPH × 1
67	0002027	878-09-20	Washer (Oil Cut) φ2.2 × φ7 × 0.25t	2	

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
68	0001243	03-15-03	F Washer -B (ϕ5 × ϕ1.8 × 0.5t)	1	
69	0002091		Plain Washer ϕ2.6 × ϕ10 × 0.8t	1	
70	7330169	AM-MO-169	Motor 2400 rpm 12V	1	
71	7310149	AM-M-149	Counter	1	
72	7190188	AM-H-188	REC/Play Head	1	
73	7190159	AM-H-159	Erase Head	1	
74		1104-01-10	Shaft (Cassette Holder)	1	
75	0002021	1104-01-92	Cassette Holder Ass'y	1	
76					
77	0002012	800-02-91	Push Button Ass'y	1	
78	0002031	1104-03-81	REC Slide Lever Ass'y	1	
79	0001197	03-03-04	Collar (REC Slide Lever)	1	
80	0001537	132-03-03	Spring (REC Safety Lever)	1	
81	0002032	201-03-03	Spring (REC Slide Lever)	1	
82	0002039	910-12-03	Collar A (Eject Lock Plate)	1	
83	0001583	09-03-02	Collar B (Eject Lock Plate)	1	
84	0001578	542-04-02	Collar A (Sub Chassis)	1	
85	0001973	542-04-08	Play Slide Lever	1	
86	0001598	09-03-02	Collar (Play Slide Lever)	1	
87	0001936	572-06-95	Reel Base Unit	2	
88	0001503	04-05-08	Back Tension Spring	1	
89					
90	0001520	369-07-01	FI Block	1	
91	0001521	446-07-01	Earth Plate	1	
92					
93	0002022	800-12-01	Bracket (Motor)	1	
94	0002030	800-12-02	Drive Belt (MAIN)	1	
95	0001842	750-12-10	Collar (Motor)	3	
96	0001843	588-09-10	Rubber Cushion (Motor)	3	
97	0001530	446-11-02	Shock Absorbing Mat	1	
98	0002029	201-07-02	Pulley (Motor)	1	
99	0002038	1104-13-10	Eject Lock Plate	1	
100	0002040	18-05-02B	Eject Lock Plate	1	
101	0002044	1104-13-02	Eject Slide Plate	1	
102	0001847	238-13-12	Spring (Eject Slide Plate)	1	
103	0002018	800-13-03	Eject Stopper Arm	1	
104					
105	0002045	1104-18-05	Eject Stopper	1	
106	0002047	800-13-06	Collar (Eject)	1	
107	0002046	800-13-07	Spring (Eject Stopper)	1	
108	0001952	408-14-07	Spring (Auto Lever)	1	
109					
110	0001601	408-15-91	Slide Lever Ass'y	1	
111	0001602	408-15-10	Spring (Slide Lever)	1	
112	0001606	408-15-03	Arm Lever	1	
113	0001835	238-13-04	Collar (Arm Lever)	1	
114	0002023	1104-16-01	Bracket (Counter)	1	
115	0002025	547-16-02	Counter Belt	1	
116	0001608	630-14-01	Leaf Switch	1	
117	0002026	1104-16-03	Collar	1	
118	0001970	542-18-81	Pause Slide Lever Ass'y	1	
119	0001605	542-18-03	Spring (Pause Lever)	1	
120	0001604	542-18-01	Pause Lever	1	
121	0001979	668-14-08	Bracket H	1	
122	0002035	668-14-85	Full Auto-Stop Ass'y (12V)	1	Plunger Ass'y
123				1	
124	0001493	04-04-05	RPH Collar	1	
125	0001496	463-04-02	EH Collar	2	
126	0002020	268-05-15	Stopper	1	REC. S Lever × 1
127	0001977	668-14-81	Planger Ass'y	1	
128	3100278		Screw w/Washer M2 × 4	2	
129	3100102		Screw (Pan Head) M2 × 3		
131	0001767		Screw (Pan Head) M2 × 11	1	RPH × 1
132	3111112		Screw (Pan Head) M2 × 12	2	EH × 2
133	3200002		Screw w/Washer M2.6 × 5	3	
134	3211105		Screw w/Washer (Pan Head)	2	
135	3111208		Screw (Pan Head) M2.6 × 8		
136	0001539		C Tapping Screw M2.6 × 4	8	

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
137	3100125		Screw (Pan Head) M3 × 5	2	
138	3211208		Screw w/Washer M2.6 × 8	2	
139			SET Screw M2 × 4	1	
140					
141	0001857		C Tapping Screw M2.6 × 6	5	
142	0002024	1104-16-04	Reinforcement Plate (Counter)	1	
143					
144					
145	0002013	1104-02-01	Bracket	1	
146					
147	0002017	03-13-07	Cord Clamp	1	EH × 1
148					
149	0001190	446-04-01	Cord Clamp	1	
150					
151	0002042	1104-01-03	Bracket 1 (Chassis)	1	
152	0002043	1104-01-04	Bracket 2 (Chassis)	1	
153					
154	0002037	1104-14-01	Muting Switch	1	
155	0001976	973-14-01	RWD Switch	1	
156	0001976	973-14-01	Pause Switch	1	
157	0002036	1104-16-02	Bracket (Switch)	1	
158					
159	0002039	910-12-03	Collar A (Eject Slide Plate)	1	
160	0001583	09-03-04	Collar B (Eject Slide Plate)	1	
161					
162	0002019	1104-04-01	Support (Cassette Holder)	1	

EXPLODED VIEW (CABINET)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REPLACEMENT PARTS LIST

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
1			AMP Wiring Board Ass'y	1	
2			Power Supply Wiring Board Ass'y	1	
3			Front Chassis Ass'y	1	
4			Terminal Board Ass'y	1	
5			Carton Box Ass'y	1	
6	1245238	R76163-010	Knob-1	1	
7	1245239	R76163-011	Knob-2	1	
8	1245240	R76163-012	Knob-3	4	
9	1245241	R76163-013	Knob-4	1	
10	1245242	R76163-041	Knob (Lever)	2	
11	1325149	R76163-004	Front Panel	1	
12	1385100	R76163-006	Frame (Meter)	1	
13	1435903	R76163-009	Plate	1	
14	1715426	R76163-027	Cover (Lamp)	1	
14A	1725060	R76163-080	Window Plate (Counter)	1	
15	1715427	R76163-001	Cover (Front)	1	
16	2125137	R76163-002	Chassis (Back)	1	
17	2165078	R7185-005	Cord Holder	1	
18	2165117	R7574-022	Cord Holder-2	1	
19	2165177	R76163-007	Cassette Holder-1	1	
20	2365416	R76163-069	Bracket (Transformer)	1	
21	2660051		Bushing (Nylon) No. 144	3	
22	2665766	SB-437-243	Snap Bushing	1	
23	2665949	R76163-072	Spacer	1	
24	2675002	R76163-073	Packing (400 × 11)	1	
25	2835613	R76163-00300	Chassis Unit (Main)	1	
26	3100302		PW Screw (Pan Head) 3 × 6 S/ZMC	2	
27	3111308		⊕ Machine Screw (Pan Head) 3 × 8 S/Z	2	
28	3111312		⊕ Machine Screw (Pan Head) 3 × 12 S/CM	2	
29	3211306		⊕ Screw w/Washer (Pan Head) 3 × 6 S/Z	2	
30	3311181		Tapping Screw (Pan Head) A3 × 8 S/Z	2	
31	3311182		Tapping Screw (Pan Head) A3 × 10 S/Z	9	
32	3385102		⊕ Tapping Screw (Binding Head) A3 × 14 S/BZ	1	
33	3510023		Nut 3 S/Z	2	
34	3610042		DT Screw (Binding Head) 3 × 6 S/BZ	4	
35	3610053		DT Screw (Binding Head) 3 × 12 S/NI	1	
36	3615068		DT Screw (Pan Head) 3 × 6 S/Z	13	
37	3615074		DT Screw (Pan Head) 3 × 16 S/Z	2	
38	3635172	R76163-071	Washer (Fiber)	1	
39	3635173	R76163-074	Washer	3	
40	3711065		Plain Washer 3 × 10 × 0.8 S/Z	3	
41	4215655	R-546A	Instruction Book	1	
42	4340025	LWS-2N	Lock Saddle	2	
43	4340026	LWS-3N	Lock Saddle	1	
44	4491108		Polyethylene Bag (A-80) 200 × 300 × 0.04	1	
45	4491205		Polyethylene Bag-B 120 × 250 × 0.10	1	
46	4491504	ZPB-E04	Polyethylene Bag-E	1	
47	7150099	AM-D-99	Fuse-1 (200 mA "T")	1	
48	7150112	AM-D-112	Fuse (800 mA "T")	1	
49	7460621	AM-S-621	Push Switch (Power Switch)	1	
50	7530680	AM-TS-680	Power Transformer	1	
51	7660254	AM-YS-254	AC Cord	1	
52	7710225	AM-Z-225	Flexible Coard	1	

3. FRONT CHASSIS ASS'Y (9192700)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
3A			Mechanism Ass'y (9192300)	1	
3B			Tape Running Ass'y (9192701)	1	
3C			Jack Board Ass'y (9192702)	1	
3D			Diode Wiring Board Ass'y (9192703)	1	
3-1	2125136	R76163-005	Front Chassis	1	
3-2	2171013		Earth Lug 3mm 0.35T	2	
3-3	2180005	70-112A	Cord Cramp	1	
3-4	2715096	R76163-039	Belt (Tape Runner)	1	
3-5	3311181		Tapping Screw (Pan Head) A3 × 8 S/Z	2	
3-6	7310147	AM-M-147	Meter	2	
3-7	7440344	EQL-Z-044	Pilate Lamp	1	LA-1

3A. MECHANISM ASS'Y (9192300)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
3A-1	1255171	R76163-020	Push Button-1	6	
3A-2	1255172	R76163-021	Push Button-2	1	
3A-3	1715425	R76163-014	Cover (Mechanism)	1	
3A-4	2165178	R76163-008	Cassette Holder-2	1	
3A-5	2325157	R76163-025	Operation Plate-3 (Clamper)	1	
3A-6	2325161	R76163-064	Slide Plate	1	
3A-7	2365409	R76163-058	Bracket (Flexibility Wire)	1	
3A-8	2455151	R76163-067	Collar (Damper)	1	
3A-9	5215227	R76163-075	Support		
3A-10	2835558	R76163-30000	Mechanism Unit	1	
3A-11	3100093		⊕ Screw (Flat Countersunk Head) 2 × 4 S/Z	1	
3A-12	3211206		⊕ Screw w/Washer (Pan Head) 2.6 × 6 S/Z	2	
3A-13	3211306		⊕ Screw w/Washer (Pan Head) 3 × 6 S/Z	1	
3A-14	3615066		DT Screw (Pan Head) 2.6 × 6 S/Z	2	
3A-15	3711115		Plain Washer 3.1 × 13 × 0.8 S/Z	1	
3A-16	3721003		"E" Ring 2.0 Sus	1	
3A-17	3730002		"G" Ring 3 × 0.6 SK/PK	1	
3A-18	3825825	R7579-032	Spring (Cassette Holder)	2	
3A-19	3825876	R76163-038	Spring (Cassette Up)	2	
3A-20	4165025	R7057-33404	Reflection Paper (Orange)	1	

3B. TAPE RUNNING ASS'Y (9192701)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
3B-1	2165179	R76102-033	Holder (Lead Switch)	1	
3B-2	2295477	R76163-065	Bracket (Tape Running)	1	
3B-3	2415120	R76163-026	Shaft Unit	1	
3B-4	2425259	R76163-028	Drum	1	
3B-5	2435056	R76163-029	Shaft Bearing	1	
3B-6	2651005	D904-041	Lamp Holder (Rubber)	1	
3B-7	3211306		⊕ Screw w/Washer (Pan Head) 3 × 6 S/Z	2	
3B-8	3630085		PS Washer 2.1 × 6 × 0.25	1	
3B-9	7440344	EQL-Z-044	Pilot Lamp	1	1AZ
3B-10	7460629	AM-S-629	Lead Switch	1	S14
3B-11	7460683	AM-S-683	Push Switch	1	S12

3C. JACK BOARD ASS'Y (9192702)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
3C-1	2365401	R76163-022	Jack Board	1	
3C-2	7210113	AM-J-113	Head Phone Jack	1	J8
3C-3	7210114	AM-J-114	Mic Jack	2	J1, 2

4. TERMINAL BOARD ASS'Y (9192704)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
4-1	7660255	AM-YS-255	Ribbon Wire-1 (460 mm)	1	
4-2	7710226	AM-Z-226	Terminal Board Unit	1	

5. CARTON BOX ASS'Y (9215900)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
5-1	4416069	ZPK-A6069	Carton Box	1	
5-2	4426031	ZPK-B6031	Cushion-1	1	
5-3	4426032	ZPK-B6032	Cushion-2	1	

25. CHASSIS UNIT (MAIN) (2835613)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
25-1	1615222	R76163-00302	Bottom Plate	1	
25-2	1735014	R76163-040	Leg (Cabinet)	4	
25-3	2115138	R76163-003	Chassis (MAIN)	1	
25-4	3615069		DT Screw (Pan Head) 3 × 8 S/Z	3	
25-5	3615070		DT Screw (Pan Head) 3 × 12 S/Z	4	
25-6	3711105		Plain Washer 3.3 × 8 × 0.5 S/Z	3	

REPLACEMENT PARTS LIST (2)

CTD-2200 (E) 2

NOTE: The parts not listed should be referred to the parts list for the standard model CTD-2200 (E) 1.

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
11	1325150	R76163-004(RD)	Front Panel	1	
13	1435928	R76163-009(RD)	Plate	1	

REPLACEMENT PARTS LIST (3)

CTD-2200 (GE) 1.

NOTE: The parts not listed should be referred to the parts list for the standard model CTD-2200 (E) 1

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
5			Carton Box Ass'y (9219490)	1	
60	1475381	R76163-070	Label-1	1	

5. CARTON BOX ASS'Y

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
5-1	4416041	ZPK-A6041	Carton Box	1	

REPLACEMENT PARTS LIST (4)

CTD-2200(GE) 2

NOTE: The parts not listed should be referred to the parts list for the standard model CTD-2200(E) 1.

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
5			Carton Box Ass'y (9219490)	1	
11	1325150	R76163-004(RD)	Front Panel	1	
13	1435928	R76163-009(RD)	Plate	1	
60	1475381	R76163-070	Label-1		

5. CARTON BOX ASS'Y

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
5-1	4416041	ZPK-A6041	Carton Box	1	

REPLACEMENT PARTS LIST (4)

CTD-2200(X)

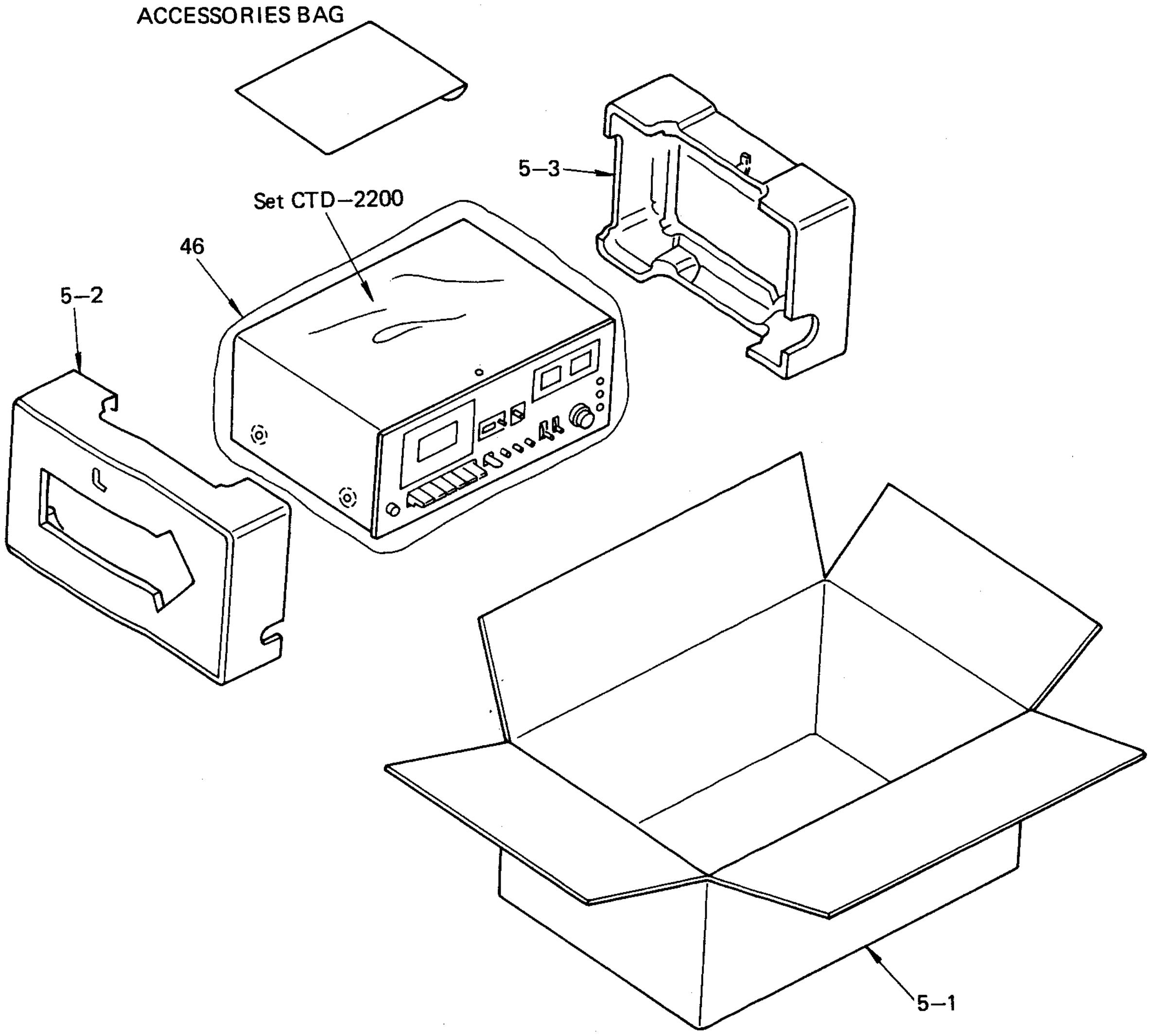
NOTE: The parts not listed should be referred to the parts list for the standard model CTD-2200(E) 1.

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
2			Power Supply Wiring Board Ass'y (9219564)	1	
5			Carton Box Ass'y	1	
16	2125142	R7748-001	Chassis (Back)	1	
50	7530699	AM-TS-699	Power Transformer	1	
51	7660260	AN-YS-260	AC Cord	1	
70	7460560	AM-S-560	Slide Switch (V. Selector)	1	S16

5. CARTON BOX ASS'Y (92195400)

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
5-1	4416069	ZPK-A6069	Carton Box	1	

EXPLODED VIEW (PAKAGE)


ACCESSORIES BAG
5–3
Set CTD–2200
46
5–2
5–1

5. CARTON BOX

Ref. No.	Stock No.	Part No.	Description	Q'ty	Remarks
5-1	4416069	ZPK-A6069	Carton Box	1	CTD-2200(E) 1 CTD-2200(E) 2 CTD-2200(X)
	4416041	ZPK-A6041	Carton Box	1	CTD-2200(GE) 1 CTD-2200(GE) 2
5-2	4426031	ZPK-B6031	Cushion-1	1	
5-3	4426032	ZPK-B6032	Cushion-2	1	

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